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31 March 2006

Mr. Mazin Enwiya
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U.S. Environmental Protection Agency
77 West Jackson Boulevard
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U.S. EPA Contract No.: 68-W7-0026
Work Assignment No.: 233-RICO-059Z
Document Control No.: RFW233-2A-AVBQ

Re: Preliminary Planning Report, Revision 1
Ellsworth Industrial Park Site

Dear Mr. Enwiya:

Weston Solutions, Inc. (WESTON) is pleased to submit for U.S. EPA's review, two copies of Revision 1 to the Preliminary Planning Report (PPR) for the Ellsworth Industrial Park Site in Downers Grove, Illinois. This revision incorporates changes to the PPR that were based on comments received from the Ellsworth Industrial Park Respondents ("Ellsworth Group"). The comments received from the Ellsworth Group include comment letters submitted by the following parties:

- Michael Baker Jr., Inc. (27 February 2006) on behalf of the Ellsworth Group
- Karaganis, White & Magel, Ltd. (27 February 2006) on behalf of the Ellsworth Group
- Swanson, Martin & Bell, LLP (27 February 2006) on behalf of Magnetrol International, Inc.
- Sachnoff & Weaver, Ltd. (27 February 2006) on behalf of Scot, Incorporated
- Sidley Austin LLP (27 February 2006) on behalf of Ames Supply Company
- Meckler, Bulger & Tilson LLP (27 February 2006) on behalf of Fusibond Piping Systems, Inc.
- Eimer, Stahl, Klevorn & Solberg LLP (27 February 2006) on behalf of Lindy Manufacturing Company
- Law Offices of Carey S. Rosemarin, P.C. (27 February 2006) on behalf of Arrow Gear Company
- Ungaretti & Harris LLP (27 February 2006) on behalf of Tricon Industries, Inc.

The content of this letter and the attached replacement pages, when used in combination with the original information contained in Revision 0 of the PPR constitute the final version of the PPR, which is submitted for your approval. This approach, using replacement pages and the explanations provided within this letter was selected as the preferred method of responding to the comments and finalizing the PPR in the most timely manner possible. Therefore, this letter and the attached replacement pages in combination with the PPR, Revision 0 (WESTON, 2006) will fulfill the requirement for the Conceptual Site Model (CSM), data gap evaluation, project planning report and Remedial Investigation/Feasibility Study (RI/FS) Work Plan as provided in the Administrative Settlement Agreement and Order (U.S. EPA, 2005). A master document integrating the revisions into the PPR will be produced in the near future.

The Triad approach has been selected by U.S. EPA for use at the Ellsworth Industrial Park site because of the complexity of the site and the size of the data gaps. The Triad approach is a U.S. EPA streamlining initiative where detailed systematic planning processes, based on an evolving CSM, are used to develop and optimize project activities. The Triad approach emphasizes managing decision uncertainty, recognizing that the contribution of site heterogeneity and sampling uncertainty to overall decision uncertainty often dwarfs the uncertainty of the analytical methods. Given this fact, the Triad approach focuses on data collection methods that can increase spatial coverage and data density for an area without sacrificing sample representativeness. At the same time, the Triad approach is an effective strategy for managing overall program costs through such methods. Cost savings can be realized, for example, by minimizing the number of mobilizations needed to reach complete characterization of the site and ensuring that the remedy is appropriately selected and designed. It is important to note in this regard that cost effectiveness and other benefits of the Triad approach can be realized at later stages within the remedial process, offsetting higher initial investments in planning and investigation activities. The Triad approach uses a weight of evidence approach to decision-making where appropriate, based on collaborative data sets. Collaborative data sets can contain data from a number of sources, including quantitative and screening analytical methods. The sampling approach detailed within the PPR attempts to utilize a number of high density methods in combination with conventional laboratory techniques to build a defensible collaborative data set for the Ellsworth Industrial Park that identifies the sources and pathways of concern in the support of remedy selection.

Data collection and decision-making under the Triad approach are centrally focused on the CSM as an essential planning and communication tool. The CSM is defined as any combination of data reporting or visualization tools used to organize what is known about the site and what additional information is required in order to reach the project's ultimate goals. Articulation of the CSM, initially as well as continuously throughout the data collection process, helps the project team identify areas of uncertainty and determine what additional information must be obtained in order to support the decision making process. In presenting the initial CSM for the Ellsworth Industrial Park, the PPR identifies significant uncertainties and data gaps due to the limited or conflicting data currently available. Among these uncertainties, for example, are the number and significance of different source areas with potential downgradient impacts that may require active remediation. The current scope of the RI as outlined in Appendix C, reflects the magnitude of these uncertainties. Using a sequenced work strategy in combination with fast, high-density methods under the Triad approach, however, the CSM will be constantly evolving and communicated as the field program progresses to optimize and direct subsequent investigation phases. It is anticipated that the refinements to the CSM from initial investigation activities will better focus the subsequent activities, producing efficiencies and potentially reducing the scope as the RI proceeds. A complete and accurate CSM is imperative for the success of the project, otherwise all decisions based on the CSM (especially calculations of risk and design of potential remedies) may be flawed. Additional information on the Triad approach and the central importance of the CSM are available at http://www.triadcentral.org/over/index.cfm.

The analytical data referenced within the PPR text and tables and illustrated on the figures was generated during numerous previous investigations at the Ellsworth Industrial Park by Illinois EPA and U.S. EPA. The previous investigations are discussed in detail in Section 1.2.2.2 of the PPR. The analytical data utilized in the PPR was compiled into a comprehensive database by U.S. EPA's FIELDS Group and WESTON. The database was developed using electronic data deliverables (EDDs) from the laboratories and hard-copies of analytical data included in previous reports. All data that was manually entered into the database was queried to ensure that duplicate references were not included in the database. In addition, queries were performed to ensure that each chemical included in the database was consistently referenced by the same caption, thereby eliminating the use of any synonyms within the database.

Following quality assurance checks, the database was loaded into the EQuIS Database format. Maintaining the compiled data and data that will be generated in the future within the EQuIS Database format will promote data integrity and ensure that no orphan data will exist or be generated. Generation of the tables contained within the PPR was completed using the cross-tab table generation capabilities of EQuIS. Table generation using EQuIS eliminates the need for manually keying analytical results into tables and eliminates the potential for transcription errors. Analytical data represented on the figures contained within the PPR was generated using the customized GIS application that directly connects the database with ArcView to eliminate the need for manually transcribing analytical data from tables to figures and eliminates the potential for transcription errors.

The address information contained within this report was obtained from DuPage County records. Addresses have been listed on the PPR Figures in order to refer to individual properties within the PPR and for planning purposes. Prior to issuing Revision 0 of the PPR on 20 and 27 January 2006, the Ellsworth Group was informed of the parcel boundaries and addresses that were proposed (based on DuPage County records) via email on 11 January 2006. Some small portion of the address information contained on the figures or in the text may be incomplete or out of date. That information is not intended to be dispositive of parcel ownership or association between parcels currently listed with the same address. As stated previously, the addresses are used for planning purposes only, and therefore were not modified based on the comments received.

The Ellsworth Group has asserted that the PPR acknowledges shortcomings with the passive soil gas technique that is being proposed. The PPR notes in Section 4.5.1, that the site geology, including the presence of clays, will be accounted for in the study design and interpretation of the results. Available literature and case studies indicate that passive soil gas techniques have met with success at sites similar to Ellsworth Industrial Park. In addition, available literature and case studies indicate that passive soil gas techniques have been successful in the much less permeable clays of the southeastern United States. The vendors consulted for the soil gas sampling program have studied the cross sections presented in Section 2 and have expressed confidence in the ability of the technique to map contaminants within and below the fine-grained sediments, which are poorly sorted silty clays. The vendors further believe that this mapping can be successful at the site using the standard placement approach for soil gas sorbers (in holes 3 feet deep), given that most of the sources of interest are estimated to be at maximum depths of 8 to 10 feet bgs. Although a Geoprobe will be available as a contingency for deeper soil placement, it is believed that standard sampler placement will be adequate at most of the passive soil gas collection locations.

The overall goal of the passive soil gas sampling program is to increase the data density and coverage at Ellsworth Industrial Park to ensure that all significant sources of chlorinated solvent contamination are discovered. This technique was identified as the preferred initial investigation method based on the potential for a large number of potential sources at the site. In addition, very little is known about many of the properties in the Ellsworth Industrial Park. The basis for the grid sampling approach outlined in the PPR is the numerous initial data gaps in combination with the numerous potential sources. The soil gas sampling approach will be optimized as the CSM evolves from initial data collection activities (the initial data gathering efforts and utility corridor surveys), and the locations and sizes of the grids may be altered. The passive soil gas sampling program followed by soil borings was selected as the most efficient way to completely identify the sources of concern at the site. During development of the QAPP, the ability of passive soil gas to identify sources of chlorinated solvent contamination will be further analyzed. If determined to be necessary, the data quality of the passive soil gas sampling can be assessed during a pilot test that could be completed during an earlier investigation phase. The need for and the potential design of any type of pilot test would be addressed in the QAPP.

The Ellsworth Group has requested additional information on the DSITMS method for soil and groundwater analysis, and how it will be applied during the RI. Specific Data Quality Objectives (DQOs) and procedures for application of the DSITMS method are outside of the scope of the PPR and will be addressed in the QAPP. However, DSITMS has been successfully applied at numerous sites, with successful examples and case studies available at www.triadcentral.org/user/ and www.tri-corders.com. Application of DSITMS at the Ellsworth Industrial Park will based on SW-846 Method 8265 as adapted by the selected vendor's written SOPs and internal Quality Assurance (QA) Plan. Copies of SOPs and an example QA Plan can be provided upon request. Based on available literature and further discussions with vendors, the sample throughput of 30 days presented in the PPR is a conservative estimate, and actual throughput is anticipated to average 60 samples per day. The samples processed will include full Quality Control (QC) analysis and reporting, with an analysis time of approximately 3 minutes per sample. Available literature and case studies have indicated strong linear correlations with off-site SW-846 Method 8260 data observed for split samples. Correlation requirements for the use of DSITMS at the Ellsworth Industrial Park will be established in the QAPP; however, it is envisioned that DSITMS correlations can be quickly established early in the RI sampling program. These correlations will be established using analysis performed at an off-site laboratory using Method 8260 with an expedited turnaround-time for approximately 10 to 20 samples. This correlation can be further refined as appropriate by continued split sampling throughout the investigation.

Sample selection for DSITMS analysis from specific borings will involve field observations and professional judgment (based on the evolving CSM) in addition to screening with hand-held monitors. The field team may also revert to systematic sampling of borings (that is, regular depth intervals) at times, such as to verify that contamination is laterally or vertically bounded. Sample selection considerations will be outlined in greater detail in the QAPP. In addition, the QAPP may specify an alternate or contingency method for the DSITMS. Analytical Method 8260 analysis is currently available from the Region 5 mobile laboratory, and an additional fast GC/MS method (10 minutes/sample) may also be available as a contingency method following pilot testing.

The scope of work included in Appendix C includes some further investigation in one area outside of Operable Unit 1 (OU1), the property south of the intersection of Curtiss and Glenview and east of Belmont. The data previously generated from the investigation of this property is not included within the tables and figures included within the PPR, but is contained within the comprehensive Ellsworth Industrial Park database. This property is not included on the figures because the primary focus of the PPR is specifically OU1. However, further investigation of this property that is located outside of the boundaries of OU1 may be beneficial to the overall characterization of the Ellsworth Industrial Park Site. During preparation of the RI, the data generated from this area during previous investigations will be presented alongside of the data generated during the upcoming field investigation.

Although a preliminary scope of work is included within the PPR, it is not intended to substitute for any portion of the Quality Assurance Project Plan (QAPP), including the Field Sampling Plan (FSP). Therefore, some details regarding equipment usage and calibration and laboratory correlation procedures have not been included within the PPR. Detailed descriptions of functional activities and quality assurance and quality control (QA/QC) protocols that will be used to achieve the desired data quality objectives (DQOs) will be provided in the QAPP, which will be prepared as part of the RI/FS.

The costs listed in Appendix C, Table C-2 are based on the preliminary scope of work detailed within this PPR. During the investigation, which is a phased approach, the scope of work will be revised continuously based on the evolving CSM. The actual scope of work that is performed during each phase of work will be based on the results of the previous phase and the evolving CSM. Therefore, the costs included within this PPR are subject to modification based on the actual scope of work that is implemented during the investigation.

In addition, the potential exists for the total cost listed in Appendix C, Table C-2 to decrease if the Ellsworth Group elects to have U.S. EPA perform the RI/FS. The potential cost savings would be a result of U.S. EPA utilizing internal resources, such as:

- U.S. EPA's Region 5 Central Regional Laboratory (CRL) for analytical support;
- U.S. EPA FIELDS Group for data management, GIS, and mapping support; and
- U.S. EPA's Region 5 Mobile Laboratory for on-site analytical support during all phases of the investigation.

If you have any questions or require clarification, please feel free to contact us.

Very truly yours,

WESTON SOLUTIONS, INC.

Joseph M. Ruiz
Site Manager

Enclosure

PRELIMINARY PLANNING REPORT
ELLSWORTH INDUSTRIAL PARK SITE
DOWNERS GROVE, DUPAGE COUNTY, ILLINOIS

WA No. 233-RICO-B51W
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Revision 1 – 31 March 2006

Prepared for

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31 March 2006

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SECTION 1

INTRODUCTION

This Preliminary Planning Report (PPR) was prepared by Weston Solutions, Inc. (WESTON®) for the United States Environmental Protection Agency (U.S. EPA) Response Action Contract (RAC), under U.S. EPA Contract No. 68-W7-0026 for Work Assignment No. RFW233-RICO-B52A. Work was conducted in accordance with the approved scope of work outlined in the Ellsworth Industrial Park, Downers Grove, Illinois, Remedial Investigation / Feasibility Study (RI/FS) Work Plan, Revision 1, dated 9 September 2005. Project team members and contributors to the development of this report included the U.S. EPA Region 5 FIELDS Team; Tetra Tech EM, Inc. (TTEMI) under OSWER Technology Transfer and Training Contract No. 68-W-02-034 administered by the Office of Superfund Remediation and Technology Innovation; and representatives of the Potentially Responsible Parties (PRP) Group for the Ellsworth Industrial Park site.

1.1 PURPOSE OF REPORT

The purpose of this PPR is to assist with the planning phase of the Remedial Investigation/Feasibility Study (RI/FS) that will be conducted for the Ellsworth Industrial Park Site. This will be accomplished by the following:

- Development of a conceptual site model (CSM);
- Identification of data gaps;
- Identification of project objectives and technical approaches to be utilized during subsequent investigations;
- Identification of preliminary applicable or relevant and appropriate requirements (ARARs);
- Identification of the project management hierarchy and management team roles and responsibilities for decision making;
- Identification of preliminary potential remedial alternatives and associated technology.

1.2 SITE DESCRIPTION AND BACKGROUND

1.2.1 Site Description

The Ellsworth Industrial Park Site is located in Downers Grove, DuPage County, Illinois (Figure 1-1). The overall Ellsworth Industrial Park groundwater contamination site encompasses the area in which chlorinated-solvent groundwater contamination has been detected in groundwater. The approximate boundaries of the overall site are Burlington Avenue to the north, 63rd Street to the south, Lee and Springside Avenues to the east, and Interstate 355 (I-355) to the west. The overall site has been further subdivided by U.S. EPA into Operable Unit 1 (OU1) and Operable Unit 2 (OU2). This PPR is specific to OU1, which consists of the industrial park proper (see Figure 1-1). OU2 consists of the groundwater contamination areas detected in the residential areas outside (south and west) of the Ellsworth Industrial Park. OU1 consists primarily of commercial/light industrial properties, and OU2 consists primarily of residential, recreational, and commercial properties. OU1 (the Ellsworth Industrial Park) is bordered on the north by Burlington Avenue; on the south by Elmore and Inverness Avenues; on the east by Belmont Avenue; and on the west by I-355. Figure 1-2 shows individual properties within the Ellsworth Industrial Park, and includes an orthophoto obtained from DuPage County. OU1 property information is summarized in Table 1-1 as obtained from DuPage County public record databases. Some small portion of the address information contained on in Table 1-1 may be incomplete or out of date. That information is not intended to be dispositive of parcel ownership or association between parcels currently listed with the same address.

1.2.2 Site History

1.2.2.1 Past and Present Operations

The Ellsworth Industrial Park was built in the late 1950's and currently consists of approximately 135 businesses. Surrounding properties encompass residential, recreational, and commercial/light industrial properties. The businesses that currently occupy the industrial park and the surrounding areas perform a broad range of activities. Detailed descriptions of historical operations have not been included within this report unless they have been determined to be relevant regarding potential sources of chlorinated solvent contamination (Section 2.3).

1.2.2.2 Previous Field Investigations

A number of past investigations have been conducted at and surrounding the Ellsworth Industrial Park by Federal, State, Municipal, and private property owners. The following subsections summarize these investigations. Analytical data from the investigations in the "Investigations Conducted by Others" subsection was not incorporated into the Ellsworth Industrial Park database, and is not reflected in the PPR tables or figures.

Initial Residential Well Sampling

Between Spring and Fall 2001, the Illinois Environmental Protection Agency (IEPA) performed residential water well sampling on the east side of I-355 near Downers Grove in response to citizen concerns related to private-well sampling in neighboring Lisle. The investigation consisted of three rounds of residential-well sampling throughout the area. Approximately 495 private wells were sampled and analyzed for levels of volatile organic compounds (VOCs). Sample results indicated elevated levels of perchloroethylene (PCE), trichloroethyene (TCE), and other related VOCs. Approximately 52% of the samples collected during Round 1 and Round 2 contained PCE or TCE above 5 micrograms per liter (µg/L) or parts per billion (ppb) (the federal drinking-water standard and the State of Illinois Maximum Contamination Limit [MCL]). The results of this investigation identified a chlorinated solvent plume within the bedrock aquifer. The approximate extent of this plume is shown in Figure 1-3.

Subsurface Groundwater Investigation

In response to initial residential well water sampling, IEPA performed a cone penetration test (CPT) investigation within the Ellsworth Industrial Park. The results of this investigation are contained in the *Subsurface Groundwater Investigation Report, Ellsworth Industrial Park* (Parsons, 2001). The investigation used a CPT rig to log the overburden lithology in the area and collect groundwater samples at a variety of depths above the bedrock in order to evaluate potential source area(s) of chlorinated solvent releases. The area of investigation included only the southern and southeastern-most portions of the industrial park along portions of Wisconsin, Elmore, and Inverness Avenues. Groundwater samples were collected using the CPT sampler and by the installation of temporary 3/4-inch polyvinyl chloride (PVC) piezometers. During the investigation, 28 groundwater samples were collected from 27 separate sampling locations within the industrial park. Of the 28 groundwater samples, one sample was found to contain TCE above the method detection limit.

Phase I Site Assessment

In February 2002, U.S. EPA and IEPA conducted additional joint-effort groundwater investigations within and outside the industrial park to further evaluate the presence of chlorinated solvent groundwater contamination and narrow down potential source areas. The results of this investigation were documented in the *Final Preliminary Groundwater Investigation Report* (Weston, 2002), and has been heretofore referred to as the Phase I Site Assessment (SA). During this study, IEPA conducted boring and sampling activities using a Geoprobe unit outfitted with a membrane interface probe (MIP) for soil logging and sample collection. U.S. EPA performed a follow-up CPT investigation throughout the industrial park and selected areas east of the park. The CPT rig was used to advance stratigraphy borings, which aided in evaluating the geology at each location, as well as identified the presence of water-bearing zones within the unconsolidated overburden soil. Each boring was advanced to refusal, which ranged from approximately 12 to 80 feet below ground surface (bgs). A total of 44 locations were advanced using the CPT and Geoprobe MIP technology. Once the stratigraphy was characterized and the water-bearing zones were identified, depth intervals were selected for groundwater sampling. A total of 37 investigative groundwater samples were collected. Chlorinated constituents, including 1,1,1-trichloroethane (TCA), tetrachloroethene (PCE), trichloroethylene (TCE), and their common degradation products, were detected at several locations and at various concentrations within the industrial park. The highest concentrations were generally found to be present along Curtiss Street between Chase Street and Katrine Avenue. The presence of TCE and PCE in shallow groundwater provided a potential link between source(s) in the industrial park and contamination observed in residential wells downgradient of the site.

Phase II Site Assessment

Based on the results of the previous groundwater investigations, a Phase II SA was undertaken as a joint effort between U.S. EPA and IEPA to further characterize chlorinated solvent contamination in soil and groundwater and identify potential source properties. The results of this investigation were documented in the *Phase II Site Assessment Report* (Weston, 2002). Prior to field investigation activities, efforts were undertaken to gather and evaluate existing data and information on properties and businesses within the industrial park. This information was used to focus field investigative efforts on potential chlorinated solvent source areas based on past and present use of these chemicals. In addition to focused investigations at specific facilities, a network of groundwater monitoring wells was also installed throughout the industrial park to begin evaluating site hydrogeologic characteristics. During the investigation, 21 soil borings were advanced, along with the installation of 25 overburden and 17 bedrock monitoring wells.

The results of the Phase II SA indicated that PCE and TCE, and their degradation products, were present at numerous and widespread locations and depths within the Ellsworth Industrial Park in soil at concentrations up to 500,000 micrograms per kilogram (ug/kg). PCE and TCE were also detected in groundwater in both glacial drift and bedrock aquifers at concentrations up to 190 ug/L. By comparison, the highest PCE/TCE concentrations observed in residential wells south of the site were typically around 15 ug/L. The compound 1,1,1-TCA was also found at significant concentrations. The data indicated that chlorinated solvent constituents appear likely to be migrating from sources within the industrial park through overburden soil, entering the bedrock aquifer system, and migrating in a downgradient direction towards the affected residences.

Supplemental Investigation

A Supplemental Investigation was undertaken by U.S. EPA to further investigate 27 additional properties within and outside of Ellsworth Industrial Park boundaries to identify properties that may have contributed to the groundwater contamination detected in the industrial park and residential areas south of the industrial park. The results of this investigation were documented in the *Data Evaluation Summary Report* (Weston, 2004). The scope of work included borehole logging and soil and groundwater sampling. Work was performed at targeted businesses or sites selected by U.S. EPA based on historical data and information. During the investigation, a total of 118 soil borings were advanced, and 67 groundwater samples were collected. PCE and TCE, and their common breakdown products were detected in shallow soil during this investigation at concentrations up to 35,000 ug/Kg, and in shallow groundwater at up to 340 ug/L.

Records Review Activities

Throughout the Ellsworth Industrial Park investigation process, U.S. EPA and IEPA have evaluated available documents and records from numerous properties and businesses within and around the industrial park to identify current and previous users of chlorinated-solvent products. In October 2001, IEPA sent out information-request letters to approximately 21 facilities that had been identified during their initial door-to-door survey of the Ellsworth Industrial Park as using chlorinated cleaners/solvents or other types of chlorinated materials. The information IEPA requested pertained to the site activities related to the purchasing, receiving, processing, storing, treating, disposing, or otherwise handling of hazardous substances. U.S. EPA issued supplemental information requests and reviewed this information supplied to U.S. EPA and IEPA, along with available records from the U.S. EPA Records Center in order to develop a list of facilities in the industrial park identified as using chlorinated solvents. U.S. EPA has, and will continue the process of gathering and evaluating background data and information into the RI/FS stage.

Investigations Conducted by Others

Several additional investigations have been conducted by others either as part of investigations related to the Ellsworth Industrial Park groundwater contamination issues, or investigations conducted by individual property owners within Ellsworth Industrial Park as part of due diligence activities. Investigations for which subsurface testing activities took place and records were available are summarized in the following subsections.

Wastewater Treatment Plant Sewage Lagoon Area Studies

An investigation was conducted at the Downers Grove Sanitary District's (DGSD) Sewage Lagoon Area in fall 2002 (Huff & Huff, Inc., 2002) This investigation consisted of two soil borings advanced through the existing sludge in the DGSD west and east lagoons; and the installation of five additional monitoring wells on their property adjacent to the lagoons. Sludge/soil samples were collected and analyzed from each of the two soil borings and groundwater samples were collected from the five newly installed wells and three existing monitoring wells. The sludge/soil and groundwater samples were analyzed for VOCs. VOCs were not detected in lagoon sludge/soil samples. VOCs were detected in groundwater confirming the presence of TCE up to 9 ug/L in U.S. EPA monitoring well BD(4I) on the DGSD property. Additional VOCs including 1,1,1-TCA, 1,1-DCA, chloroethane, and vinyl chloride were detected in two of the newly installed monitoring wells. Based on groundwater flow directions presented, this report concluded that the presence of VOCs in groundwater was due to an off-site source.

Chase-Belmont Properties Subsurface Soil Investigation

An investigation was conducted by in January 2003 on the five buildings addressed as 5000-5111 Chase Avenue, Downers Grove, Illinois (EarthTech, 2003). A total of 16 geoprobe soil borings were advanced during this investigation at depths ranging from 16 to 20 ft bgs. Sixteen soil samples and four water samples were collected during this investigation at various locations around the buildings and analyzed for VOCs. PCE was detected in shallow soil at concentrations up to 165 ug/Kg. PCE and TCE were detected in shallow groundwater samples at concentrations up to 23 ug/L and 10 ug/L, respectively.

U.S. EPA Hydrogeologic Investigations 2003 and 2004

The U.S. EPA conducted additional hydrogeologic characterization in 2003 and 2004 in the vicinity of the Ellsworth Industrial park. Activities were conducted in what is currently designated OU1, as well as in OU2 (residential area). Investigation activities consisted of geophysical logging in select residential water supply wells, and water level monitoring throughout the OU1 and OU2 area. These investigations concluded that wells open to the drift aquifer indicate downward vertical groundwater flow but no consistent horizontal groundwater flow direction. Groundwater flow directions in the bedrock aquifer are predominantly from northwest to southeast and does not appear to have been altered by the cessation of pumping from residential water wells as they were abandoned or decommissioned due to municipal water supply hookup. Geophysical logging indicated that fractures in the dolomite bedrock tend to be concentrated at certain elevations, but elevation patterns were not evident.

Due Diligence and Hydrogeologic Investigations - 2537 Curtiss Street Property

A number of investigations have been conducted at the 2537 Curtiss Street property beginning with a Phase I Environmental Site Assessment (ESA) in November 2000 (Environmental Group Services, Ltd., 2000). The Phase I ESA indicated that chlorinated solvents had been used at the facility and staining and solvent odors were present within expansion joints of the concrete foundation. Based on these results, a Phase II investigation was conducted (Environmental Group Services, Ltd., July 2001). During this investigation, three soil borings were advanced below the concrete foundation within the building. Soil samples were collected and analyzed for VOCs and only minor compound detections were observed. An expanded Phase II investigation was also conducted (Environmental Group Services, Ltd., September 2001) in which additional borings were advanced within the building foundation footprint. PCE was detected in two soil samples ranging from 14 to 33 ug/Kg. 1,1,1-TCA was also detected. Based on these results, two additional investigations were carried out to investigate the hydrogeologic characteristics of the site and determine whether chlorinated solvents were present in shallow groundwater. The results of these investigations were summarized in two reports (Environmental Group Services, Ltd., December 2001, January 2002). Ten shallow monitoring wells were installed on-site, and soil and groundwater samples were collected. These hydrogeologic investigations concluded that the shallow subsurface geology is variable and consists primarily of tills interbedded with saturates silt, sand, and gravel layers. Shallow groundwater is contained within these seams and layers at between 13 and 30 feet bgs; however, several wells were also observed to be dry, indicating a perched groundwater system was likely present at shallow depths. PCE, TCE, and iii-TCA were detected in subsurface soil at concentrations up to 119 ug/Kg, 6.6 ug/Kg, and 61.6 ug/Kg, respectively. PCE and TCE were also found to be present in groundwater samples from the shallow monitoring wells at concentrations up to 140 ug/L and 8.5 ug/L, respectively. PCE/TCE daughter products were also observed at low levels.

Focused Site Investigation - 2659 Wisconsin Avenue Property

Focused site characterization activities were conducted as part of a remedial action conducted at the 2659 Wisconsin Avenue property (Pioneer Environmental, Inc, 2000 and 2001). Background information indicates chlorinated solvents were used at this facility and a release was documented through a floor drain which impacted soil in a small area on the east side of the building. PCE, TCE, and their daughter products were detected in subsurface soil in this area based on soil boring and sample collection. These reports indicate that the nature and extent of chlorinated solvent contamination was delineated and performed subsequent risk analyses in accordance with IEPA regulations. Groundwater was not encountered during the focused investigations.

Phase II Site Investigations - 2525 Curtiss Street Property

A Phase I ESA was conducted at the 2525 Curtiss Street property in July 2000 (Caddis, Inc., July 2000). The Phase I ESA indicated that various hazardous substances, including chlorinated solvents, were handled at the facility, and recommended subsequent sampling take place. Based on this recommendation, a Phase II Site Investigation was conducted (Caddis, Inc., August 2000). Information contained in this report indicated a 2,000 gallon waste solvent UST was removed from the site in 1988. Ten soil borings were conducted at locations around the facility. PCE was detected from all soil samples collected exterior to the south side of the building at concentrations up to 238 ug/Kg. Metals and PCBs were not detected above background levels and PCBs were not detected above laboratory detection limits. A Supplemental Phase II Investigation was conducted the following year (Caddis, Inc., October 2001). Eleven additional soil borings were advanced on the south, east, and west sides of the property. PCE was detected in four of the 11 soil borings at concentrations ranging from 71.3 ug/Kg to 350 ug/Kg. TCE was also detected at 41.2 ug/Kg. DCE and 1,1,1-TCA were also detected in soil during this investigation.

UST Corrective Action Completion Report - 5225 Walnut Avenue Property

A UST Corrective Action Completion report was prepared for the 5225 Walnut property and submitted to IEPA (United Environmental Consultants, Inc., September 1999). A 2,500 gallon mineral spirits UST was removed from this property under OSFM Tank Removal Permit #00462-1999. The OSFM representative concluded upon removal that a release had occurred due to strong odors associated with the excavation and an observed sheen on water within the excavation cavity. The release was classified as a "minor" release. Incident No. 991205 was assigned to the release. Approximately 1,750 gallons of liquids were removed using vacuum equipment and approximately 195 cubic yards of soil and backfill were excavated and removed. UST excavation closure soil sampling took place in accordance with IEPA protocol and no constituents were detected above 35 Illinois Administrative Code (IAC) Part 742 Tier I soil cleanup objectives. Although specific correspondence is not available, site personnel indicated that subsequent to the UST removal, three shallow groundwater monitoring wells were installed on the property to evaluate whether the UST had impacted shallow groundwater. No early results of sampling of these wells was received; however, these wells were sampled during the U.S. EPA Phase II Site Assessment in 2002 and VOCs were not detected.

1.3 REPORT ORGANIZATION

This Preliminary Planning Report is divided into eight sections, which include the following:

- **Introduction** - This section details the purpose of this PPR and includes a description of the site and a detailed description of the site history.

- **Conceptual Site Model** - This section develops an initial CSM from the existing data. The CSM includes site characteristics, contaminant characterization, potential source areas, known and potential routes of migration, and exposure pathways and receptors. The CSM will be used as the primary planning tool that organizes what is already known about the site for the purpose of identifying required additional data and information.

- **Data Gaps Analysis** - This section identifies the gaps that are present in the existing data. In addition, this section will provide recommendations on the amount and type of data that is required to adequately characterize the site.

- **Project Objectives and Technical Approach** - This section details the general overview of the project objectives, and provides a framework for development of specific details regarding future characterization of the site.

- **Preliminary Applicable or Relevant and Appropriate Requirements (ARARs)** - This section provides a preliminary list of the three types of ARARs that will be used to ensure that remedial action objectives (RAOs) are determined correctly, and the remedial alternatives are developed with ARARs in mind.

- **Preliminary Potential Remedial Alternatives and Associated Technology** - This section utilizes the information developed in the CSM to identify a preliminary range of broadly defined potential remedial alternatives and associated technology relevant to the known site characteristics.

- **Project Management** - This section identifies the technical and the management teams, and defines the roles and responsibilities for decision making.

- **References** - This section provides a list of the references used in compiling this report.

SECTION 2

CONCEPTUAL SITE MODEL

2.1 SITE CHARACTERISTICS

2.1.1 Surface Features, Topography, and Physiography

Multiple surface features are located within and surrounding the Ellsworth Industrial Park Site, including paved roadways, alleys, and sidewalks; residential structures; commercial/industrial buildings; parking lots; open vegetated areas; a wastewater treatment plant; and lightly wooded areas. In addition, St. Joseph Creek runs through the site from east to west in the northern half of the site. A detailed site map (Figure 1-2) identifies important surface features of the site and illustrates the site boundaries.

The overall ground surface elevation of the site varies by approximately 50 feet. Ground surface elevations increase moving north or south away from St. Joseph Creek. Although a topographic survey of the site has not been completed, the ground surface where the monitoring wells have been previously installed ranges from approximately 686 to 717 feet above mean sea level (MSL).

The site is situated within the Wheaton Morainal Country of the Great Lakes Section of the Central Lowland Physiographic Provence (Willman, 1971). The Wheaton Morainal Country is characterized by complex morainal topography with a greater relief and more complicated slope patterns than in most of northeastern Illinois. Irregularly shaped hills, mounds, and ridges are intermingled with basins, marshes, and occasional lakes. The surface drainage pattern is geologically young and incomplete. Site drainage appears to be towards the St. Joseph Creek from the north and south portions of the industrial park.

2.1.2 Surrounding Land Use and Populations

The Ellsworth Industrial Park Site is located in Downers Grove, DuPage County, Illinois. Downers Grove is a developed area containing mainly residential, commercial, and light industrial properties.

The area in the vicinity of the Ellsworth Industrial Park Site consists of a mixture of residential, recreational, commercial, and light industrial properties. The overall land use in DuPage County is 36% residential, 37% commercial/industrial, 19% open space, and 8% undeveloped/agricultural. In addition, based on the 2000 United States Census, there are 48,724 people living within Downers Grove.

2.1.3 Meteorologic Parameters

The climate in the metropolitan Chicago area, including DuPage County, is typical of northern Illinois, with hot summers and cold winters. Low pressure areas and associated weather fronts bring frequent changes in temperature, humidity, cloud cover, and wind direction during much of the year. Average temperature ranges (minimum to maximum) were from 38.8 to 60.0 degrees Fahrenheit (°F). The total annual precipitation averages approximately 36 inches, with an average seasonal snowfall of 36 inches.

2.1.4 Geology and Hydrogeology

2.1.4.1 Regional

The following subsections describe the regional soil conditions, geologic conditions, occurrence of groundwater, and surface-water conditions in the vicinity of the Ellsworth Industrial Park Site. Information is based primarily on data obtained from the public record.

Surficial Soil

According to the Soil Conservation Service Soil Survey of DuPage County, Illinois (United States Department of Agriculture, 1997), the following surficial soil series are present within the industrial park:

- Ashkum silty clay loam
- Beecher silt loam
- Markham silt loam
- Urban Land - Orthents

By far the largest percentage of area within the industrial park is designated Urban Land. Urban

Land consists of areas altered by the presence of pavement, parking lots, and buildings so as to make the identification of the underlying soil impracticable. The Urban Land - Orthents is generally comprised of undulating clayey, fine-textured soil that has been altered by cutting and mixing.

A small area within the industrial park, west of the 2301 Curtiss Street property, is classified as Markham silt loam and is described as a gently sloping, moderately well-drained soil found on ridges, knolls, and side slopes of glacial till plains or moraines on uplands. Typically, the surface layer is black silt loam about 8 inches thick. The subsoil is about 28 inches thick. The upper part is brown silty clay, the middle part is mixed brown mottled clay loam; and the lower part is light olive brown silty clay loam. The underlying material, extending to a depth of 5 feet, is olive brown mottled very firm silty clay loam.

The extreme northeast corner of the industrial park, between Chase and Belmont Avenues, is classified as Markham silt loam and Beecher silt loam. The Markham silt loam is described in the foregoing paragraph. The Beecher silt loam is nearly level, somewhat poorly drained soil on low ridges and in shallow depressions and drainageways on uplands. Typically, the surface layer is very dark gray silt loam about 7 inches thick. The subsoil is about 28 inches thick. The upper part is dark grayish brown mottled silty clay, the middle part is light olive brown mottled firm silty clay loam, and the lower part is light olive brown mottled silty clay loam. The underlying material, extending to a depth of 5 feet, is olive brown mottled very firm silty clay loam.

The extreme northwest corner of the industrial park, in the general vicinity of the Downers Grove Public Works building (5101 Walnut Avenue), consists of Ashkum silty clay loam. Ashkum silty clay loam is nearly level, poorly drained soil along drainage ways and in depressions between ridges on glacial plains. Typically, the surface layer is black silty clay loam about 11 inches thick. The subsoil is about 36 inches thick. The upper part is very dark gray mottled firm silty clay; the middle part is gray mottled firm silty clay loam; and the lower part is mixed gray and yellowish brown mottled very firm silty clay loam. The underlying material to a depth of 5 feet is mixed gray yellowish brown mottled very firm silty clay loam containing scattered pebbles.

Although several additional soil assemblages are present in the residential areas surrounding the industrial park, the soil types are similar in makeup to those silt and silty clay loams described above.

Glacial Deposits and Bedrock

Glacial till and glacial stratified drift deposits are common throughout the area underlying surficial soil and are the result of material deposition by advancing and retreating glaciers. The native glacial deposits in the vicinity of the industrial park consist of relatively impermeable silty and clayey tills of the Valparaiso Morainic System. Based on geologic information gathered, these low-permeability deposits dominate the area; however, scattered layers and lenses of sand and gravel are present within the till complex.

Unconsolidated materials in the area also consist of local deposits of sand and gravel of the Henry Formation. These deposits of sand and gravel are generally well sorted and evenly bedded. According to literature, these deposits are expected to be present along the course of St. Joseph Creek, flowing through the site area, and have been confirmed with site-specific drilling information. Thickness of these sand and gravel deposits is expected to be variable. These permeable deposits may directly contact or overlie bedrock in the area based on relative borehole elevations.

Glacial deposit thickness varies in this portion of Illinois from surface outcrop to thicknesses greater than 300 feet. Bedrock was encountered during this investigation as well as during previous phases of well construction (private and municipal). The depth to bedrock at the site is estimated to range from approximately 60 feet bgs to greater than 100 feet bgs. Variation is due to changes in topographic elevation and the potential for local erosion of the bedrock surface.

The uppermost bedrock unit present in the vicinity of the site consists of the Silurian-aged Racine Dolomite. This formation consists of a fine- to medium-grained dolomite with textures that vary from dense to vesicular to vuggy. Shale beds may also be present locally with the Racine

Formation.

U.S. EPA obtained drilling records throughout the area from the Illinois State Geological Survey (ISGS) through their Public-Industrial-Commercial Survey (PICS) database. This data contained latitude, longitude, and drillers descriptions of the subsurface lithology at each location, including depth to bedrock. These bedrock elevation data were combined with bedrock elevation data from monitoring wells and soil boring drilling data within OU1 to prepare a bedrock surface contour map. This contour map is included as Figure 2-2. The regional bedrock surface generally slopes toward the south/southeast across the region. Figure 2-2 suggests that two erosional features (i.e., buried bedrock valleys) are present in the study area. One bedrock valley is present along the axis of St. Joseph Creek. The second valley intersects St. Joseph Creek, between Belmont and Lee Avenues, and slopes toward the south/southwest (east and south of the industrial park).

Groundwater Occurrence and Use

Groundwater is obtained from four major aquifer systems in northeastern Illinois – glacial drift, shallow carbonate bedrock, and two divisions of the deep bedrock system. The glacial drift aquifer system is restricted to the unconsolidated materials overlying bedrock, more specifically, to the sand and gravel outwash deposits. The shallow bedrock aquifer system consists of those bedrock units that directly underlie the glacial drift and are recharged locally by precipitation. The major units of the shallow carbonate system, underlying the site, are dolomites of the Silurian-aged Racine Formation. Deep groundwater is obtained primarily from two bedrock units consisting of the Glenwood-St. Peter Sandstone and deeper sandstones of the Ironton-Galesville Formations. Together, the two deep sandstone units and portions of the overlying Galena-Platteville Formation are known as the Cambrian-Ordovician aquifer system in northeastern Illinois.

Prior to introduction of Lake Michigan water to the Downers Grove area in 1992, the city maintained several municipal water supply wells in the vicinity of the site. Based on existing records, these wells were all open to the shallow dolomite aquifer. The city maintains one dolomite well (Well #10, also designated as PW-10 in previous investigations) within the industrial park as a backup well. Although no borehole record has been identified, the owner has indicated this well is approximately 285 feet deep and is typical of the previous municipal wells operated in this area. Information relayed to U.S. EPA indicates that Well #10 may have been abandoned recently (U.S. EPA, September 2005). This information has not yet been confirmed.

2.1.4.2 Site-Specific

<u>Geology</u>

From evaluation of the intrusive work performed throughout the Ellsworth Industrial Park area by IEPA, U.S. EPA, and others; some preliminary conclusions about the geologic and hydrogeologic characteristics of the area can be drawn. The site can be characterized as stratigraphically complex, with significant localized heterogeneity in geologic materials above the bedrock. Both glacial drift and post-glacial alluvial sequences are present in close proximity.

Generally thicker deposits of low-permeability silty-clayey tills are present in areas away from St. Joseph Creek in the north and south directions. Scattered sand and gravel layers and lenses are present and widespread within the till matrix. Many of these layers and lenses appear laterally isolated and discontinuous; however, it is noted that some may be interconnected as portrayed on cross sections. The overall degree of connectivity of silt, sand, and gravel layers and lenses within the silty clay and clayey silt till structure is not known.

Markedly different geologic conditions are present within the erosional basin of St. Joseph Creek. Along the approximate axis of the creek, significant deposits of permeable sand and gravel (alluvium) are present. These deposits, however, are also interbedded with low permeability layers of silt and clay throughout the area. Because of the lack of observed continuity between interbedded layers of sands, gravels, silts, and clays in the alluvial sequence with distance, these materials may have been deposited within a braided stream and/or valley train depositional environment. It is noted, however, that permeable sand and gravel (alluvium or outwash) was observed in direct contact with bedrock along the approximate axis of St. Joseph Creek at several locations. These sand and gravel deposits appear to finger into the silty-clayey tills in several areas to the north and south, within and adjacent to the creek basin, in a non-continuous fashion. Outwash sand and gravel deposits also appear to underlay the thick silty clay till layer in the southern portion of the industrial park.

Twelve geologic cross sections were developed based on the lithologic data collected during previous field investigations sponsored by the IEPA and U.S. EPA. The layout of each cross section is illustrated by Figure 2-3 and the geologic cross sections are depicted by Figures 2-4 through 2-8.

Cross sections A-A' and B-B' illustrate subsurface conditions in the southern portion of the industrial park, away from St. Joseph Creek. Cross section A-A' extends from west to east along Elmore and Inverness Avenues, between Walnut and Belmont Avenues. Cross section B-B' extends from west to east across several OU1 properties roughly parallel to Wisconsin Avenue to the intersection with Belmont Avenue. The stratigraphy of this portion of the industrial park consists predominantly of fine-grained till deposits with low permeabilities. One IEPA CPT location (CPT-39) was advanced to 97 feet bgs and is inferred to have refused on bedrock. This inference is based on relative bedrock elevations observed at nearby drilling locations. Scattered, generally discontinuous lenses and layers of coarse-grained materials are encountered sporadically within the till matrix at various depths. These units are generally less than 5 feet thick. A thicker sand and gravel sequence may be located in the vicinity of CPT-07 and CPT-08 at depths below 45 feet bgs, although it is not known whether this represents a laterally continuous zone or a just a larger layer/lens. Given its relation to deeper granular deposits to the north, it may be interconnected with deeper portions of sand and gravel units in the vicinity of St. Joseph Creek.

Cross Section C-C' extends from west to east across multiple OU1 properties between Curtiss Street and Wisconsin Avenue from roughly I-355 to east of Belmont Avenue. Two major geologic structures were observed across this transect - predominantly fine-grained silty clay tills overlying sand and gravel outwash. The upper silty clay till layer is approximately 30 to 70 feet thick. The lower sand and gravel layer is approximately 10 to 30 feet thick and appears to be in direct contact with the underlying Silurian Dolomite bedrock. Both sequences contain scattered lenses of differing lithologies (sand and silt layers in the upper clayey till and silt and clay layers in the lower outwash layer). Bedrock depths range from 50 to 85 feet bgs in the western portion and from 35 to 65 feet bgs in the eastern portion of the transect.

Cross Section D-D' extends from west to east along Curtiss Street, between Walnut and Belmont Avenues. In general, till deposits of lower permeability are found near the surface at thicknesses ranging from 4 to 17 feet in the western portion of the section to greater than 25 feet near Belmont Avenue. In addition, a thick (> 60 feet) but isolated till zone may extend to the bedrock surface near the 2500 Curtiss Street property; however, its extent appears limited and may be due to filling during realignment of St. Joseph Creek in this area historically during property development. The most significant feature of this transect is thick zones of alluvial sand and gravel encountered beneath surficial fine-grained deposits. Coarse-grained deposits, up to 50 feet thick, are present and typically contain scattered lenses of silt and clay, usually in thicknesses of less than 10 feet. Bedrock was encountered at a depth of approximately 55 to 65 feet bgs in the western portion and from 45 to 60 feet bgs in the eastern portion of the transect, and it appears throughout much of this area that the thicker sands and gravel deposits are directly overlying the bedrock formation.

Cross Section E-E' extends from west to east across the Downer's Grove WWTP and OU1 properties north of St. Joseph Creek. The upper most layer consists of coarse-grained alluvial deposits on the western portion of the WWTP property where the transect closely aligns with St. Joseph Creek; to a fine-grained till layer on the central and eastern portions of this transect that contains alternating sequences of silt, sand, and gravel. The upper till layer appears eroded along the approximate length of St. Joseph Creek and replaced with alluvial deposits, which are bounded by fine-grained tills along the central and eastern portions of the transect. The alluvial deposits are thickest beneath the WWTP property (approximately 20 to 30 feet) and become thinner as they extend between the upper and lower till units. The alluvial deposits also incorporate many thin clay lenses (< 5 feet thick). A lower till unit lies beneath the alluvial deposits and extends to the bedrock surface in the central portion of the transect. The lower tills finger into the alluvial deposits in the central and eastern portions of transect E-E'. Bedrock depth ranges from approximately 60 to 65 feet BGS across the entire transect. As with other transects, it appears that thicker sequences of sand and gravel deposits are present along the approximate axis of St. Joseph Creek directly overlying bedrock. These give way to thicker low permeability tills away from the creek with a high degree of interfingering of sand and gravel layers to the north and south.

Cross section F-F' illustrates subsurface conditions near the northern perimeter of the OU1 site. Cross Section F-F' extends from west to east along Burlington Avenue, between Walnut and Pershing Avenues. Two major soil units were observed across this transect; fine-grained tills overlying sand and gravel outwash. The upper till layer is much thicker in this area and is approximately 65 to 70 feet thick. The lower sand and gravel layer is approximately 3 to 15 feet thick and in contact with bedrock. The lower permeability till sequence contains scattered lenses of differing lithologies (sand, gravel, and silt). Bedrock depths range from approximately 75 to 80 feet bgs across this transect.

Cross Sections G-G', H-H', I-I', J-J', K-K' and L-L' are oriented perpendicular to St. Joseph Creek at locations on either end of the industrial park and through the approximate center. In general, these transects indicate thick sequences of fine-grained tills to be present in areas further north and south of St. Joseph Creek. The materials are described primarily as clayey silt to silty clay. These materials approach a thickness of 100 feet in the extreme southeast corner of the industrial park based on IEPA CPT information. Scattered, generally discontinuous lenses and layers of coarse-grained materials are encountered sporadically within the till matrix at thicknesses generally less than 10 feet. Based on the number of shallow boring refusals, it is probable that a significant amount of boulders and cobbles are present within the fine-grained till matrix. As previously described, copious amounts of sand and gravel are present along the approximate axis of St. Joseph Creek, and sharply contact bedrock in the area. Thicker alluvial deposits appear to extend from 1,500 to more than 2,000 feet north and south of St. Joseph Creek, gradually thinning with distance until only a primarily moderately thick generally continuous layer remains on top of bedrock. This unit likely extends outside OU1 in all directions based on data gathered to date. Approximate bedrock depths were observed as follows: 40 to 60 feet bsg near the axis of St. Joseph Creek; 75 to 80 feet bsg on the northern end of the industrial park; and 85 to 100 feet bsg on the southern end of the industrial park.

Hydrogeology

Site hydrogeologic data gathered as part of previous investigative activities, indicate groundwater occurrence is variable across the site. In general, three distinct water bearing zones have been identified within OU1. These consist of a shallow groundwater zone, an intermediate glacial drift aquifer zone, and a bedrock aquifer system. Water level elevation gathered as part of previous investigations is summarized on Table 2-2. Well construction data is contained on boring logs and well construction summaries contained in Appendix A of this report, as well as other reports contained in the references (Section 8)

Shallow Groundwater Zone

Based on relative water level elevations observed from previous drilling and stratigraphy data, groundwater appears to be present within shallow sediments within OU1. This groundwater zone is generally associated with what appears to be saturated silt, sand, and gravel seams and layers within the predominantly lower permeability silty clay tills found near the surface and extending to various depths. Groundwater classified as such is generally found within the first 30 feet of sediments. While water level data is not available from a majority of locations, some limited groundwater elevation data is available from monitoring wells installed by individual property owners in the shallow groundwater zone. Water level data obtained from these wells suggest that head levels are significantly higher than other nearby glacial drift wells and independent of the deeper water bearing zones. These data, combined with stratigraphy data, indicate these water bearing zones are likely perched, but the degree of continuity across the site is not known. Contaminant levels within this groundwater zone suggest a certain degree of continuity is present, at least locally, and are also likely connected to the thicker sand and gravel deposits along the axis of St. Joseph Creek. In these areas it appears a potential complete pathway for flow to the bedrock aquifer (underlying the industrial park) exists in a wide area along the approximate axis of St. Joseph Creek. It also appears that in some areas, groundwater in these zones is likely to occur in discontinuous layers/lenses of silty sands within an overall silty clay matrix. Several shallow wells were noted to be dry and groundwater was not able to be obtained from numerous shallow borings.

Previous attempts have been made to contour shallow water level data, however, no distinct flow patterns were evident. Water levels were found to fluctuate and flow directions may shift frequently in response to local weather patterns. Specific pathways for groundwater flow are difficult to define due to this localized heterogeneity of shallow glacial drift deposits. As such, local groundwater flow paths may be tortuous and lead to preferential pathways for groundwater flow to enter the intermediate groundwater zone and bedrock aquifer.

Intermediate Aquifer Zone

The intermediate aquifer zone underlying OU1 represents a complex flow regime. This system primarily occurs in the vicinity of alluvial deposits encountered along the approximate axis of St. Joseph Creek. As described previously, however, numerous low permeability layers and lenses of clay/silt are present within this system. In some areas, sand/gravel zones are thick and well-defined, while in other areas they appear to be sparse and discontinuous. Sometimes these transitions are abrupt.

Previous attempts at contouring the potentiometric surface are contained in the reports referenced in Section 8 and have indicated groundwater flow within this system is variable and difficult to define. A potentiometric surface contour map was developed for this system based on July 2004 water level information collected by the U.S. EPA, and can be found in Figure 2-9. Although U.S. EPA collected additional water level information in September 2003 and October 2004 (U.S. EPA, September 2005), the July 2004 dataset represents the most complete dataset of recent water levels and was selected for contouring. This map illustrates that groundwater flow is variable across the site and is locally controlled by the presence of drift deposits with varying permeabilities. Overall, the intermediate flow system appears to represent a series of groundwater divides and troughs confined laterally to the St. Joseph Creek alluvial sequences by the presence of thick silty clay deposits to the north and south. In the eastern portion of OU1, groundwater appears to flow westerly, while in the north-central portion of OU1, a groundwater elevation high is present with flow to the south and west. These converging flow directions culminate in what appears to be a potentiometric surface trough or basin in the central portion of the study area along Curtiss Street. Another groundwater low point is found to the west of Katrine Avenue. These groundwater low points may represent areas of groundwater recharge to the bedrock aquifer system from the overburden drift saturated zones.

The 2003 and 2004 U.S. EPA investigation indicated that water levels, open to the drift aquifer, display downward vertical flow conditions but inconsistent flow patterns. As a result, the EPA concluded that water levels obtained from the drift aquifer are of limited use for determining groundwater flow directions at this time due to the limited information available.

A review of head levels at nested well pair locations indicates that hydraulic communication is likely between the intermediate (unconsolidated) and bedrock aquifer systems. Well nests BD-8 (I) / BD-8(D), as well as SB-3(I) / SB-3(D), have intermediate and bedrock head levels within one foot of each other. Vertical hydraulic gradients, computed for these nested well pairs, indicate a downward potential for groundwater flow between the overburden and the bedrock aquifer system.

<u>Bedrock Aquifer System</u>

Based on the 17 bedrock monitoring wells installed during previous investigations, several potentiometric surface contour maps for the bedrock system were developed and are depicted by Figures 2-10 through 2-12. Overall, local groundwater flow within the upper portion of the bedrock aquifer is toward the south-southeast. This flow is consistent with regional flow evaluations discussed previously, based on more distant bedrock wells. The overall regional flow of the bedrock aquifer is shown in Figure 2-1. An average hydraulic gradient was calculated at approximately 0.0016 feet per foot (ft/ft) to the south-southeast. Some potentiometric surface variation is evident beneath the industrial park. Most notably, a groundwater mound is visible in the south-central portion of the site, where the groundwater elevation was found to be several feet higher than nearby bedrock wells screened in the same aquifer zone. Groundwater is expected to flow radially out from this area and merge into the general south-southeast flow direction. Several elevation highs and lows are noted within the overall south-southeast groundwater flow direction. Although some seasonal elevation variation is noted, groundwater flow directions within the bedrock aquifer appear generally consistent over the time frames observed. Groundwater flow is expected to be controlled within the upper portions of the Silurian Dolomite by the presence and magnitude of weathering, fractures, and jointing patterns.

2.1.4.3 Surface Water

The natural surface drainage patterns at the site appear to have been significantly altered due to development of the industrial park and adjoining residential areas. Surface-water flow patterns at the site are controlled by St. Joseph Creek, which runs through the industrial park from east to west. An extensive storm sewer system is present within the industrial park to channel runoff to St. Joseph Creek. North of the creek, surface water generally flows to the south into the creek; and south of the creek, surface water generally flows north into the creek. St. Joseph Creek flows west and empties into the East Branch of the DuPage River approximately one to two miles west of the industrial park.

Based upon information contained in Phase I Environmental Site Assessments for some of the commercial properties within the industrial park, a 100- and 500–year floodplain is present along St. Joseph Creek but is confined to a rather narrow band along its length.

2.2 CONTAMINANT CHARACTERIZATION

2.2.1 Types of Contaminants

The main types of contaminants at the Ellsworth Industrial Park Site, and the focus of this Preliminary Planning Report, are chlorinated solvent volatile organic compounds. The primary chlorinated solvent constituents detected in soil, shallow groundwater, and bedrock groundwater at the Ellsworth Industrial Park are PCE, TCE, and TCA. Other volatile organic constituents, hereafter referred to as secondary chlorinated solvents, consist of degradation products of PCE/TCE, and include 1,1-dichloroethene (1,1-DCE), 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethane (1,2-DCA), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), and vinyl chloride (VC). In addition to these, carbon tetrachloride (PCM), although not a degradation product of PCE/TCE, has been detected at significant concentrations and is considered a secondary chlorinated solvent. Table 2-3 lists the chemical properties of these constituents.

Chlorinated solvents are all colorless liquids at room temperature and have a sweet ethereal odor resembling chloroform. Chlorinated solvents also have the following general characteristics:

- Low liquid viscosities - this characteristic allows chlorinated solvents in liquid form to easily move into the subsurface.
- Low interfacial tensions with water - this characteristic allows chlorinated solvent dense non-aqueous phase liquids (DNAPLs) to enter water-filled voids easily.
- High rate of volatilization - this characteristic allows chlorinated solvents to move through the unsaturated zone as gasses.
- Low absolute solubilities - this characteristic makes chlorinated solvents difficult to remove from the groundwater zone. However, the solubilities are generally high when compared to drinking water standards, which makes cleanup to drinking water standards difficult.
- Low partitioning to soils - this characteristic indicates that migration of chlorinated solvents may not effectively be retarded by the soil matrix.
- Low degradation rates - this characteristic contributes to the persistence of chlorinated solvent compounds in the subsurface.

Soil and groundwater data also indicate that PCE/TCE may be undergoing some reductive dechlorination at the site as it is migrating. This is evidenced by the presence of several common biodegradation breakdown products (e.g., 1,1-DCE, trans- and cis-1,2-DCE, etc.); however, the completeness and rate of degradation is not known.

2.2.2 Existing Data Analysis

2.2.2.1 Soil

Summary

A total of 475 soil samples, including field duplicates, have been collected from a total of 196 sampling locations during the multiple investigations at the Ellsworth Industrial Park conducted by IEPA and U.S. EPA. The analytical data associated with these soil samples is included within Appendix B, and was compiled and distributed by the U.S. EPA FIELDS Team for use. All soil sample locations are shown in Figure 2-13, and sample numbers, depths, and date of sample collection are included within Table 2-4. Sampling techniques and sample location/depth rationale will not be discussed within the Preliminary Planning Report. These specific information are contained in previous reports of investigations referenced in Section 8.

Detections of chlorinated solvents above laboratory detection limits are included in Table 2-5. The distribution of soil borings where at least one chlorinated solvent was detected above laboratory detection limits are shown in Figure 2-14.

Preliminary Screening Criteria

Preliminary screening criteria were developed for use as a tool when attempting to determine the estimated extent of contamination in soil. The preliminary screening criteria developed within this Preliminary Planning Report are not cleanup criteria or Remedial Action Objectives, which will be developed during the RI/FS process. The preliminary screening criteria are presented in Table 2-6. The screening criteria were developed using the following:

- Soil Remediation Objectives for Industrial/Commercial properties listed in 35 IAC Part 742, Tiered Approach to Corrective Action Objectives (TACO), Appendix B, Table B, with the following exposure pathways:
  - Industrial/Commercial Worker Ingestion Pathway
  - Industrial/Commercial Worker Inhalation Pathway
  - Construction Worker Ingestion Pathway
  - Construction Worker Inhalation Pathway
  - Soil Component of the Groundwater Ingestion Exposure Pathway for Class I Groundwater
  - Soil Component of the Groundwater Ingestion Exposure Pathway for Class II Groundwater

- U.S. EPA Region 9 Preliminary Remediation Goals with the following exposure pathways:
  - Direct Contact Exposure Pathway - Industrial Soil
  - Migration to Groundwater - Soil Screening Levels (SSLs), Dilution Attenuation Factor (DAF) 20
- U.S. EPA Region 3 Risk Based Criteria with the Industrial Soil exposure pathway.

The eight criteria listed above were included, and the most stringent (lowest value) was selected to be used as conservative preliminary screening criteria when determining the estimated extent of contamination in soil discussed in the following subsection.

Extent of Contamination

Analytical results of the soil samples were compared to the preliminary screening criteria to determine the estimated extent of chlorinated solvent contamination at the site. Analytical data for primary and secondary chlorinated solvent constituents that were detected in soil at concentrations exceeding their respective preliminary screening criteria are listed in Table 2-7, and shown on Figure 2-15. For the purposes of this extent of contamination analysis, "contamination" refers to samples where concentrations exceed the preliminary screening criteria. Figures 2-16 through 2-26 show soil samples within 5-foot depth intervals with concentrations exceeding the preliminary screening criteria. Primary and secondary chlorinated solvents are presented on separate maps. If a discrete 5-foot depth interval does not contain any detections of chlorinated solvents that exceed the preliminary screening criteria, a figure was not created for that depth interval. In addition, Figures 2-16 through 2-26 show the estimated extent of contamination within each 5-foot depth interval for each of the primary and secondary chlorinated solvents (if sufficient data was available). Because this extent of contamination delineation is as estimation based on the existing data, the extent of contamination is illustrated with a line to demonstrate that these lines are only estimations.

The extent of contamination was determined by interpolating between data points to determine where soil concentrations would be expected to be approximately at or below laboratory detection limits. In addition, indirect evidence of contamination was also used in the evaluation. For example, where soil analytical data was absent but soil borings were conducted, results of VOC logging using MIP technologies and continuous field screening for total VOCs with photo-ionization equipment, were utilized to draw preliminary conclusions regarding the extent of contamination. In addition, where applicable, contours have been added to the figures to illustrate different concentrations within delineated areas of contamination to aid in viewing the magnitude of concentrations present. The contours illustrated on these figures reflect only an estimate based on conservative interpolation of sometimes limited data. They are intended only for planning purposes and may overstate the extent of the contamination that will ultimately be identified in the RI. They are not intended as, and should not be relied on as, final or definitive delineations.

As shown in Figure 2-16, only two locations had primary chlorinated solvent detections exceeding the preliminary screening criteria within the 0 to 5 ft bgs depth interval. These exceedances are located within the property at 2250 South Curtiss Street and 2525 Curtiss Street.

- 2250 South Curtiss Street - PCE and TCE contamination was encountered at X-100 within the grab sample collected at 1 ft bgs. The vertical extent of contamination is not determined within soil boring X-100, because only one soil sample was collected from this location.

- 2525 Curtiss Street - PCE and TCE contamination was encountered at GP-41 within the grab sample collected at 4.0 ft bgs. The vertical extent of TCE contamination at GP-41 is estimated to extend from 0 to 14 ft bgs, as the sample from 14 ft bgs did not have a TCE concentration that exceeded the preliminary screening criteria. The vertical extent of PCE contamination is not determined within soil boring GP-41 because the PCE concentration at 14 ft bgs also exceeds the preliminary screening criteria.

As shown in Figure 2-17, five areas had primary chlorinated solvent detections exceeding the preliminary screening criteria within the 5 to 10 ft bgs depth interval. These areas where the exceedances are located include the following properties: 2250 South Curtiss Street, 2525 Curtiss Street, 5400 Janes Avenue, 2655 Wisconsin Avenue, and 5200 Katrine Avenue.

- 2250 South Curtiss Street - PCE and TCE contamination was encountered at SB-8 within the depth interval of 8 to 10 ft bgs. The vertical extent of contamination is not determined within this soil boring, because the only other sampling interval at SB-8 was from 34 to 36 ft bgs, in which TCE exceeded the preliminary screening criteria.

- 2525 Curtiss Street - PCE contamination encountered within GP-28 from 7 to 8 ft bgs and PCE and TCE contamination encountered within GP-31 at 8 ft bgs. The vertical extent of contamination is not determined within this boring because the depth intervals listed previously within soil borings GP-28 and GP-31 were the only samples collected from these two borings.

- 5400 Janes Avenue - PCE and TCE contamination was encountered at GP-52 at 7.5 ft bgs. The vertical extent of contamination is not determined within this soil boring, because the only other sampling interval at GP-52 was at 12 ft bgs, which also contains PCE and TCE exceedances of the preliminary screening criteria.

- 2655 Wisconsin Avenue - TCE contamination encountered within GP-82 from 5.5 to 6.5 and 9.5 to 10.5 ft bgs, and within GP-83 from 5.5 to 6.5 ft bgs. The vertical extent of contamination within this area has been determined, with the vertical contamination within GP-82 extending from the ground surface to a maximum of 16.5 ft bgs, and the vertical contamination within GP-83 extending from the ground surface to a maximum of 9.5 ft bgs.

- 5200 Katrine Avenue - TCE and TCA contamination encountered at GP-53 at 9.5 ft bgs. The vertical extent of contamination is not determined within this soil boring, because the only other sampling interval at GP-53 was at 7.5 ft bgs, and did not have any exceedances, which indicates that the contamination begins below 7.5 ft bgs and continues downward vertically to an unknown depth.

As shown in Figure 2-18, five areas had primary chlorinated solvent detections exceeding the preliminary screening criteria within the 10 to 15 ft bgs depth interval. These areas where the exceedances are located include the following properties: 2250 South Curtiss Street, 2525 Curtiss Street, 2301 Curtiss Street, 2424 Wisconsin Avenue, and 5400 Janes Avenue.

- 2250 South Curtiss Street - TCE contamination was encountered at GP-27 at 13 ft bgs, and at SB-21 within the depth interval of 10 to 12 ft bgs. The vertical extent of contamination can be estimated within each of these borings because GP-27 (18 ft bgs) and SB-21 (24 to 26 ft bgs) have deeper soil samples with concentrations below the preliminary screening criteria.

- 2525 Curtiss Street - PCE contamination encountered within GP-41 at 14 ft bgs. The vertical extent of contamination is not determined within this boring because PCE contamination was discovered in a shallow sample (4 ft bgs), and no deeper samples were collected.

- 2301 Curtiss Street - PCE and TCE contamination was encountered at GP-22 at 14 ft bgs. The vertical extent of contamination is not determined within this soil boring, because no other sampling intervals were collected within GP-22.

- 2424 Wisconsin Avenue - TCA contamination encountered within GP-129 from 10.5 to 11.5 ft bgs. The vertical extent of contamination within this area has been determined, with the vertical contamination within GP-129 extending from 3.5 ft bgs to a maximum of 23.5 ft bgs.

- 5400 Janes Avenue - PCE and TCE contamination encountered at GP-52 at 12 ft bgs. The vertical extent of contamination is not determined within this soil boring, because the only other sampling interval at GP-52 was at 7.5 ft bgs, which also had both PCE and TCE exceedances.

As shown in Figure 2-19, four areas had primary chlorinated solvent detections exceeding the preliminary screening criteria within the 15 to 20 ft bgs depth interval. These areas where the exceedances are located are as follows: 2250 South Curtiss Street (including one soil boring on 2324 Curtiss Street), 5000-5014 Chase Avenue, 2400 Curtiss Street, and 2525 Curtiss Street.

- 2250 South Curtiss Street - TCE contamination was encountered in GP-24 at 15 ft bgs, in SB-7 from 18 to 20 ft bgs, in SB-20 from 18 to 20 ft bgs, and in OV-8 from 15 to 22.5 ft bgs. The vertical extent of contamination is completely undetermined in GP-24 and SB-20 because the deeper samples in each boring exceed the preliminary screening criteria. The vertical extent of contamination in SB-7 and OV-8 can be determined to have an upper limit because of shallow samples with concentrations below the preliminary screening criteria. The contamination in SB-7 extends from a minimum of 12 ft bgs to an undetermined depth (at least 20 ft bgs), and the contamination in OV-8 extends from a minimum of 10 ft bgs to an undetermined depth (at least 22.5 ft).

- 5000-5014 Chase Avenue - PCE contamination was encountered in GP-137 from 19.5 to 20.5 ft bgs. The vertical extent of contamination can be determined because the groundwater surface is located at approximately 20.5 ft bgs. Therefore, the vertical extent of contamination in GP-137 extends from a minimum depth of 10 ft bgs to 20.5 ft bgs.

- 2400 Curtiss Street - PCE contamination was encountered in GP-8 at 16 ft bgs. The vertical extent of contamination cannot be determined for GP-8 because the deeper sample (23 ft bgs) also exceeds the preliminary screening criteria. Therefore, it is assumed that the vertical extent of contamination in GP-8 is completely undefined and extends to an unknown depth (at least 23 ft bgs).

- 2525 Curtiss Street - PCE contamination was encountered at OV-6 from 16 to 18 ft bgs. The vertical extent of contamination can be determined for OV-6 because the deeper sample (32 to 34 ft bgs) does not exceed the preliminary screening criteria. It is assumed that the vertical extent of contamination begins somewhere near the ground surface and extends to a maximum depth of 32 ft bgs.

As shown in Figure 2-20, two areas had primary chlorinated solvent detections exceeding the preliminary screening criteria within the 20 to 25 ft bgs depth interval. These areas where the exceedances are located include 2250 South Curtiss Street and 2400 Curtiss Street.

- 2250 South Curtiss Street - TCE contamination was encountered at BD-7 from 20 to 22.5 ft bgs, at GP-26 at 21 ft bgs, and at SB-20 from 20 to 22 ft bgs. The vertical extent of contamination is not determined within either GP-26 or SB-20, because no deeper sample interval exists in SB-20, and the deeper interval in GP-26 is also contaminated, and shallow sample intervals are contaminated. However, the vertical extent of contamination within BD-7 can be estimated because the deeper sample (37.5 to 40 ft bgs) does not exceed the preliminary screening criteria. It is assumed that the vertical extent of contamination in BD-7 begins somewhere near the ground surface and extends to a maximum of 37.5 ft bgs.

- 2400 Curtiss Street - PCE contamination was encountered at GP-8 at 23 ft bgs. The vertical extent of contamination is not fully determined within GP-8 because there are no deeper samples and the shallow sample (16 ft bgs) is contaminated.

As shown in Figure 2-21, one area had primary chlorinated solvent detections exceeding the preliminary screening criteria within the 25 to 30 ft bgs depth interval. This area is located within the northwest section of the property at 2250 South Curtiss Street.

- 2250 South Curtiss Street - PCE and TCE contamination was encountered at GP-25 at 27 ft bgs, and at GP-26 at 27 ft bgs. The vertical extent of contamination is not determined within either of these borings because no other sample intervals within GP-25 exist, and the sample from GP-26 at 21 ft bgs exceeds the preliminary screening criteria for TCE.

As shown in Figure 2-22, one area had primary chlorinated solvent detections exceeding the preliminary screening criteria within the 30 to 35 ft bgs depth interval. This area is located within the southern portion of the property at 2250 South Curtiss Street.

- 2250 South Curtiss Street - TCE contamination was encountered at SB-8 from 34 to 36 ft bgs. The vertical extent of contamination is not determined within SB-8 because the other sample from 8 to 10 ft bgs exceeds the preliminary screening criteria for TCE.

As shown in Figure 2-23, two areas had primary chlorinated solvent detections exceeding the preliminary screening criteria within the 35 to 40 ft bgs depth interval. These areas where the exceedances are located include 2250 South Curtiss Street and 2400 Curtiss Street.

- 2250 South Curtiss Street - TCE contamination was encountered at GP-24 at 37 ft bgs, and at SB-9 from 36 to 38 ft bgs (directly above the groundwater surface). The vertical extent of contamination is not determined within either of these borings because no deeper sample intervals exist. However, it is assumed that the vertical extent of contamination in GP-24 is completely undefined because the other sample interval at 15 ft bgs exceeded the preliminary screening criteria for TCE, and the vertical contamination within SB-9 is estimated to begin at 16 ft bgs and extend to 38 ft bgs.

- 2400 Curtiss Street - PCE contamination was encountered at GP-9 at 35 ft bgs. The vertical extent of contamination is not fully determined within GP-9 even though the other sample at 10 ft bgs does not exceed the preliminary screening criteria. The vertical extent of contamination is estimated to begin at 10 ft bgs and extend to an unknown depth (at least 35 ft bgs).

As shown in Figure 2-24, two areas had primary chlorinated solvent detections exceeding the preliminary screening criteria within the 40 to 45 ft bgs depth interval. These areas where the exceedances are located include 2301 and 2324 Curtiss Street.

- 2301 Curtiss Street - PCE contamination was encountered at OV-3 from 40 to 42 ft bgs, which is located directly above the groundwater surface. Therefore, the vertical extent of contamination can be determined to begin deeper than 36 ft bgs and extend to 42 ft bgs.

- 2324 Curtiss Street - TCE contamination was encountered at SB-5 from 40 to 42 ft bgs. The vertical extent of contamination can be determined to begin deeper than 26 ft bgs and extend to an unknown depth (at least 42 ft bgs).

As shown in Figure 2-25, three areas had secondary chlorinated solvent detections exceeding the preliminary screening criteria within the 5 to 10 ft bgs depth interval. These areas where the exceedances are located include 5200 Katrine Avenue, 5400 Janes Avenue, and 2424 Wisconsin Avenue. A horizontal or vertical extent of contamination for secondary chlorinated solvents (excluding PCM) was not determined, and is therefore not illustrated on Figure 2-25.

As shown in Figure 2-26, three areas had secondary chlorinated solvent detections exceeding the preliminary screening criteria within the 10 to 15 ft bgs depth interval. These areas where the exceedances are located include 5400 Janes Avenue and 2424 Wisconsin Avenue. A horizontal or vertical extent of contamination for secondary chlorinated solvents (excluding PCM) was not determined, and is therefore not illustrated on Figure 2-26.

- 2424 Wisconsin Avenue - PCM contamination was encountered in GP-130 from 11.5 to 12.5 ft bgs. The vertical extent of contamination can be determined to be between 4.5 ft bgs and a extend to a maximum depth of 20.5 ft bgs.

2.2.2.2 Groundwater

Summary

A total of 185 groundwater samples, including field duplicates, have been collected from a total of 152 sampling locations during the multiple investigations at the Ellsworth Industrial Park. The analytical data associated with these groundwater samples is included within Appendix B, and was compiled and distributed for use by the U.S. EPA FIELDS Team. For purposes of examining the groundwater at the Ellsworth Industrial Park Site, the groundwater has been classified as one of three types of groundwater: shallow, intermediate, and bedrock. All groundwater samples collected at depths between the ground surface and 30 ft bgs have been classified as shallow groundwater. All groundwater samples collected at depths beginning at 30 ft bgs and extending to the surface of the bedrock have been classified as intermediate groundwater. All groundwater samples collected from the bedrock have been classified as bedrock groundwater. Table 2-8 includes the sample numbers, depths, dates of sample collection, and which of the three classifications the sample was designated. The groundwater sample locations for shallow, intermediate, and bedrock groundwater are shown in Figures 2-27, 2-28, and 2-29, respectively. Sampling techniques and sample location/depth rationale will not be discussed within the Preliminary Planning Report. These specific information are contained in previous reports of investigations referenced in Section 8.

Detections of chlorinated solvents above laboratory detection limits in shallow, intermediate, and bedrock groundwater are included in Tables 2-9, 2-10, and 2-11, respectively. The groundwater sample locations where at least one chlorinated solvent was detected above laboratory detection limits in shallow, intermediate, and bedrock groundwater are shown in Figures 2-30, 2-31, and 2-32, respectively.

Preliminary Screening Criteria

Preliminary screening criteria were developed for use as a tool when attempting to determine the extent of contamination in groundwater. The preliminary screening criteria are presented in Table 2-12. The preliminary screening criteria developed within this Preliminary Planning Report are not cleanup criteria or Remedial Action Objectives, which will be developed during the RI/FS process. The screening criteria were developed using the following:

- Groundwater Remediation Objectives for the Groundwater Component of the Groundwater Ingestion Route, listed in 35 IAC Part 742, TACO, Appendix B, Table E.
- U.S. EPA National Primary Drinking Water Regulations - MCLs.
- U.S. EPA Region 9 Preliminary Remediation Goals - Direct Contact Exposure Pathway: Tap Water.

The three criteria listed above were included, and the most stringent (lowest value) was selected to be used as conservative preliminary screening criteria when determining the extent of contamination in groundwater in the following subsection.

Extent of Contamination

Analytical results of the groundwater samples were compared to the preliminary screening criteria to determine the extent of chlorinated solvent contamination at the site. Analytical data for primary and secondary chlorinated solvent constituents that were detected in shallow, intermediate, and bedrock groundwater at concentrations exceeding their respective preliminary screening criteria are listed in Tables 2-13, 2-14, and 2-15, respectively. For the purposes of this extent of contamination analysis, "contamination" refers to samples where concentrations exceed the preliminary screening criteria. Figures 2-33 through 2-38 show groundwater samples within each of the three classifications with concentrations exceeding the preliminary screening criteria. Primary and secondary chlorinated solvents are presented on separate maps. In addition, Figures 2-33 through 2-38 show the estimated extent of contamination within each groundwater classification.

The extent of contamination was determined by interpolating between data points to determine where groundwater concentrations would be expected to be approximately at or below laboratory detection limits. In addition, indirect evidence of contamination was also used in the evaluation. For example, where groundwater analytical data was absent but soil borings were conducted and attempts to collect groundwater samples were unsuccessful (i.e., dry hole or lack of saturation), this information was utilized to draw preliminary conclusions regarding the extent of contamination. Because this extent of contamination delineation is as estimation based on the existing data, the extent of contamination is illustrated with a line to demonstrate that these lines are only estimations. In addition, where applicable, contours have been added to the figures to illustrate different concentrations within contaminant plumes. The contours illustrated on these figures reflect only an estimate based on conservative interpolation of sometimes limited data. They are intended only for planning purposes and may overstate the extent of the contamination that will ultimately be identified in the RI. They are not intended as, and should not be relied on as, final or definitive delineations.

Shallow Groundwater

As shown in Figure 2-33, six areas have primary chlorinated solvent plumes exceeding the preliminary screening criteria within the shallow groundwater. The extent of contamination for each of the six plumes have been estimated on Figure 2-33, along with approximate concentration contours. As stated above, the extent of contamination has been estimated to extend to where concentrations in shallow groundwater are at or below laboratory detection limits, or where groundwater was determined not to be present. The extent of contamination has not been interpolated outside of the OU1 boundaries. The two plumes located in the center of the site may be commingled, but it is unclear if this is the case based on the existing data. Therefore, these two plumes will be treated as separate entities within this Preliminary Planning Report.

As shown in Figure 2-36, two areas have PCM plume exceeding the preliminary screening criteria within the shallow groundwater. The extent of contamination for each of the two plumes have been estimated on Figure 2-36, along with approximate concentration contours. The extent of contamination has not been interpolated outside of the OU1 boundaries. Although other secondary chlorinated solvent concentrations exceeded the preliminary screening criteria within the shallow groundwater, the extent of contamination have not been determined for these compounds due to limited data points.

The contours illustrated on these figures reflect only an estimate based on conservative interpolation of sometimes limited data. They are intended only for planning purposes and may overstate the extent of the contamination that will ultimately be identified in the RI. They are not intended as, and should not be relied on as, final or definitive delineations.

Intermediate Groundwater

As shown in Figure 2-34, three areas have primary chlorinated solvent plumes exceeding the preliminary screening criteria within the intermediate groundwater. The extent of contamination for each of the three plumes have been estimated on Figure 2-34, along with approximate concentration contours. The extent of contamination has been estimated to extend to where concentrations in intermediate groundwater are at or below laboratory detection limits. The extent of contamination has not been interpolated outside of the OU1 boundaries. The potential exists for the two western plumes to be commingled, but it is unclear if this is the case based on existing data. In addition, the delineation suggests the potential that all three plumes may be interconnected in certain locations, but it is unclear if this is the case based on existing data. Therefore, all three plumes will be treated as separate entities within this Preliminary Planning Report.

As shown in Figure 2-37, one sample from the intermediate groundwater had a concentration of 1,2-DCE that exceeded the preliminary screening criteria. Because this was the only secondary exceedance within the intermediate groundwater, the extent of contamination has not been determined for 1,2-DCE.

The contours illustrated on these figures reflect only an estimate based on conservative interpolation of sometimes limited data. They are intended only for planning purposes and may overstate the extent of the contamination that will ultimately be identified in the RI. They are not intended as, and should not be relied on as, final or definitive delineations.

Bedrock Groundwater

As shown in Figure 2-35, two large areas have primary chlorinated solvent plumes exceeding the preliminary screening criteria within the bedrock groundwater. The extent of contamination for each of the two plumes have been estimated on Figure 2-35, along with approximate concentration contours. The extent of contamination has been estimated to extend to where concentrations in bedrock groundwater are at or below laboratory detection limits. The extent of contamination has not been interpolated outside of the OU1 boundaries. No figure was created for the secondary chlorinated solvents in bedrock groundwater because there were no concentrations that exceeded the preliminary screening criteria.

The contours illustrated on this figure reflect only an estimate based on conservative interpolation of sometimes limited data. This figure is intended only for planning purposes and may overstate the extent of the contamination that will ultimately be identified in the RI. It is not intended as, and should not be relied on as, a final or definitive delineation.

2.2.2.3 Surface Water

Only one surface water sample has been collected during past investigations at the Ellsworth Industrial Park. Minor amounts of VOC constituents were detected in this sample; however, similar compounds were detected in associated laboratory blank samples; therefore, their presence was attributed to laboratory artifacts. This media will not be discussed further within this Preliminary Planning Report, but may still be addressed during the RI/FS.

2.2.2.4 Sediment

A total of 15 sediment samples were collected during past investigations at the Ellsworth Industrial Park. The analytical data associated with these groundwater samples is included within Appendix B, and was compiled and distributed for use by the U.S. EPA FIELDS Team. No primary or secondary chlorinated solvents were detected during this sampling. Therefore, this media will not be discussed further within this Preliminary Planning Report, but may still be addressed during the RI/FS.

2.3 POTENTIAL SOURCES

During the previous investigations, a number of areas have been identified as potential sources of the chlorinated solvent contamination in the soil and groundwater within OU1. For the purposes of this PPR, the source areas have been categorized into two classifications; potential source areas and other possible source areas. OU1 has been further subdivided into Primary Study Areas and Secondary Study Areas based on the presence of contaminants as shown on Figure 2-38 (excluding the Property South of the Intersection of Curtiss and Glenview and East of Belmont). The properties that comprise each study area are listed below, along with historical information that led to the determination of the areas.

Primary Study Subareas

- **Subarea A:** This area encompasses the property located at 2400 Curtiss Street, which was formerly referred to as the Rexnord Property. Limited background information is available for the historical operations at this facility; however, U.S. EPA information indicated that this facility formerly used TCE and generated F001 wastes. The main facility has been in place for over 40 years. Aerial photo analysis indicates areas of soil staining, drum storage, previous drainage ways, etc. in several areas of the site, most predominantly in the southwest area of the building and areas under building additions.

- **Subarea B:** This area encompasses the two properties located around the cul-de-sac located at the northern end of Chase Avenue, listed as 5110 Main Street and previously referred to as the Tricon Property, and 5000-5014, 5023, and 5024 Chase Avenue, previously referred to as the Chase-Belmont Properties.

- **Subarea C:** This area includes properties with the following addresses: 2250 South Curtiss Street (formerly referred to as the Precision property), 2324 Curtiss Street (formerly referred to as Rexnord Filaments Division), 2201 Curtiss Street and the property adjacent to the west (listed as Elwood Industrial Dev. Co.), 2301 Curtiss Street (formerly referred to as the Arrow Property), 2301 Curtiss Street, and 5240 Belmont Road.

  Background information indicates the facility at 2250 South Curtiss Street operated a solvent degreaser system possibly in the southwest portion of the building. Historical records indicate that drum storage was also conducted on the north side of the main building at 2324 Curtiss Street. Hazardous waste storage is currently being conducted in this area. Oil-stained, degraded concrete is prevalent. Background information indicates that the facility located at 2301 Curtiss Street has been in operation since 1957, used TCE, and may have generated F001 wastes from degreasing operations. Aerial photo analysis indicates soil staining and drum/waste storage areas southwest of the building. These areas are now under later building additions. Several discharge lines, which outfall to the St. Joseph Creek, were identified on the north side of the building.

- **Subarea D:** This area includes properties with the following addresses: 2435 Wisconsin Avenue and the property located immediately east (listed as LaGrange State Bank 467), 2451 Wisconsin Avenue, 2525 Wisconsin Avenue (formally referred to as the Flexco Property), 5400 Janes Avenue, and 2333 Wisconsin Avenue (formerly referred to as the Litton/Magnetek Property).

  Background information gathered by the Agencies indicates the facility located at 2525 Wisconsin Avenue operated a vapor degreaser to remove excess oil from bolts and nuts. Approximately five drums of TCE were used in the process. In 1977, a 250-gallon storage tank was placed on the concrete floor near the degreaser.

- **Subarea E:** This area encompasses 2400 and 2424 Wisconsin Avenue. No additional background information was available.

- **Subarea F:** This area encompasses the property located at 2655 Wisconsin Avenue, which was formerly referred to as the Lovejoy Property. According to available background information, the 2655 Wisconsin property has previously had unspecified hazardous materials used in four "black oxide" tanks at the property. Waste streams sampled in 1992 indicate the presence of PCE in one sample at a level of 0.021 mg/L.
- **Subarea G:** This area includes properties with the following addresses: 2525 Curtiss Street (formerly referred to as the Scot Property), 2537 Curtiss Street (formerly referred to as the Ames Property), a property on the southeast corner of Katrine Avenue and Curtiss Street listed under Downers Grove National Bank (formerly referred to as the Fusibond Property), 5200 Katrine Avenue (formerly referred to as the Lindy Property), and 2222 Wellington Court (formerly referred to as the Molex Property).

  Background information indicates the facility at 2525 Curtiss Street has been in operation since 1958, used chlorinated solvents, and operated a solvent degreaser. A waste solvent UST was removed south of the building in 1988. Unspecified discharge pipes are present on the west side of the building. Background information indicates the facility located at 2537 Curtiss Street was a generator of hazardous waste and was in operation between 1962 and 2000. It was previously reported that a solvent degreaser was present at this facility, however, this information will be verified during the upcoming RI/FS. Aerial photo analysis indicates waste storage and potential staining under a current building on the east side of the property located at the southeast corner of Katrine Avenue and Curtiss Street. Aerial photo analysis indicated soil staining and potential waste storage along the western boundary of the property located at 5200 Katrine Avenue. The facility currently operates a solvent degreaser and uses TCE. Aerial photo analysis indicates a significant drainage way enters this area of the property from the south. The facility at 2222 Wellington Court (Molex) has been documented as a large-quantity generator and TCA user by U.S.

EPA.

Secondary Study Subareas

- **Subarea H:** This area encompasses 2222 Wellington Court (5225 Walnut Avenue), which was previously referred to as the Molex Property. A mineral spirits UST was removed from this property in 1999 with subsequent soil and groundwater sampling.

- **Subarea I:** This area includes properties with the following addresses: 2464 Wisconsin Avenue (formerly referred to as Seatt/Silkscreener Property), 2514-2518 Wisconsin Avenue (formerly referred to as CVP Systems Property, and 2538 Wisconsin Avenue (formerly referred to as Norwood Property).

- **Subarea J:** This area includes properties with the following addresses: 2800 Hitchcock Avenue (formerly referred to as a Molex Property), 2820 Hitchcock Avenue,2824 Hitchcock Avenue (formerly referred to as Bales Mold Service Property), and 5006 Walnut Avenue.

  Background information indicates that a TCE vapor degreaser was located at the property, but has been decommissioned. The company also indicated that it generates waste hydrochloric acid (HCl), nitric acid (HNO_3), and potassium hydroxide (KOH) from refinishing operations.

- **Subarea K:** This area encompasses 5300 Belmont Road, which was previously referred to as the Magnetrol Property. Historical information indicates a 500-gallon TCE tank was present on this property and chlorinated solvents were used prior to 1995. Records indicate a TCE tank may have been removed in 1990. Waste manifest documents indicate both PCE and TCE were used at this facility between 1980 and 1995. Additionally, U.S. EPA information indicates a reported 10,992-pound release of TCE occurred between 1987 and 1992.

Other Study Areas

- **2500 Curtiss Street:** The facility consists of a one-story warehouse and manufacturing building. Historical information indicates that the building was constructed in 1987 and was used for aftermarket and original manufacturing of automotive equipment, including gears.

- **Property South of the Intersection of Curtiss and Glenview and East of Belmont:** This area was the site of a former wastewater treatment plant. Sampling was performed at this area during the 2004 investigation by U.S. EPA. No additional information was available.

2.3.1 Potential Source Areas

Potential source areas were identified as areas or facilities where source material is reasonably expected to be present based on evidence obtained during previous investigations. Primary Study Areas A through G shown on Figure 2-38, include some potential source areas based on the following rationale.

2.3.1.1 Subarea A

The potential sources in Subarea A include the following:

- The area around the PCE soil contamination in GP-8 from 15 to 20 and 20 to 25 ft bgs, shown in Figures 2-19 and 2-20, respectively.
- The area around the PCE soil contamination in GP-9 from 35 to 40 ft bgs, shown in Figure 2-23.
- The TCE and PCE groundwater contamination centered around BD-2 and OV-1, within the intermediate groundwater shown in Figure 2-34.
- The potential contamination located under the building within Subarea A, which is unknown because no soil samples have been collected from under the building.

2.3.1.2 Subarea B

The potential sources in Subarea B include the following:

- The PCE soil contamination in GP-137 from 15 to 20 ft bgs, shown in Figure 2-19.
- The PCE, TCA, and TCE contamination centered around GP-137, within the shallow groundwater shown in Figure 2-33.

- The potential contamination located under the buildings within Subarea B, which is unknown because no soil samples have been collected from under the buildings.

2.3.1.3 Subarea C

The potential sources in Subarea C include the following:

- The PCE and TCE soil contamination in X-100 from 0 to 5 ft bgs, shown in Figure 2-16.
- The soil contamination in SB-8 (PCE and TCE) from 5 to 10 ft bgs, and the soil contamination (TCE) from 30 to 35 ft bgs, shown in Figures 2-17 and 2-22, respectively.
- The TCE soil contamination in GP-22 and GP-27 from 10 to 15 ft bgs, shown in Figure 2-18.
- The PCE and TCE soil contamination in OV-8 and SB-20 from 15 to 20 ft bgs, shown in Figure 2-19.
- The TCE soil contamination in GP-26 from 20 to 25 ft bgs, shown in Figure 2-20.
- The PCE and TCE soil contamination in GP-25 from 25 to 30 ft bgs, shown in Figure 2-21.
- The TCE soil contamination in GP-24 from 35 to 40 ft bgs, shown in Figure 2-23.
- The TCE soil contamination in SB-5 from 40 to 45 ft bgs, shown in Figure 2-24.
- The TCE soil contamination in OV-3 from 40 to 45 ft bgs, shown in Figure 2-24.
- The TCE contamination centered around CPT-50, within the intermediate groundwater shown in Figure 2-34.
- The potential contamination located under the buildings within Subarea C, which is unknown because no soil samples have been collected from under the buildings.

2.3.1.4 Subarea D

The potential sources in Subarea D include the following:

- The PCE and TCE soil contamination within GP-52 from 5 to 15 ft bgs, shown in Figures 2-17 and 2-18.

- The potential contamination located under the buildings within Subarea D, which is unknown because no soil samples have been collected from under the buildings.

2.3.1.5 Subarea E

The potential sources in Subarea E include the following:

- The TCA soil contamination in GP-128 from 10 to 15 ft bgs, shown in Figure 2-18.

- The TCA contamination centered around GP-128, within the shallow groundwater shown in Figure 2-33.

- The potential contamination located under the buildings within Subarea E, which is unknown because no soil samples have been collected from under the buildings.

2.3.1.6 Subarea F

The potential sources in Subarea F include the following:

- The TCE soil contamination in GP-82 and GP-83 from 5 to 10 ft bgs, shown in Figure 2-17.

- The potential contamination located under the building within Subarea F, which is unknown because no soil samples have been collected from under the building.

2.3.1.7 Subarea G

The potential sources in Subarea G include the following:

- The soil contamination in GP-41 (PCE and TCE) from 0 to 5 ft bgs, and the soil contamination (PCE) from 10 to 15 ft bgs, shown in Figures 2-16 and 2-18, respectively.

- The PCE soil contamination in OV-6 from 15 to 20 ft bgs, shown in Figure 2-19.

- The PCE and TCE soil contamination in GP-31 from 5 to 10 ft bgs, shown in Figure 2-17.

- The TCA and TCE soil contamination in GP-53 from 5 to 10 ft bgs, shown in Figure 2-17.

- The PCE and TCE contamination centered around MW-3, within the shallow groundwater shown in Figure 2-33.

- The potential contamination located under the buildings within Subarea G, which is unknown because although some soil sampling has occurred under the building, the results of these samples are not incorporated into the PPR.

2.3.2 Other Potential Source Areas

The other possible source areas identified within the Secondary Study Areas shown on Figure 2-38 (excluding the Property South of the Intersection of Curtiss and Glenview and East of Belmont) have been selected based on historical operations, limited access during previous investigations, or analytical data that is incomplete but indicates the possibility of a possible chlorinated solvent source. The following areas have been selected for further investigation as other possible source areas.

- Subarea H - this subarea has been selected as another possible source area based on historical information, previous analytical data, and the lack of data about conditions within the building footprint.

- Subarea I - this subarea has been selected as another possible source area based on historical information, previous analytical data, and the lack of data about conditions within the building footprint.

- Subarea J - this subarea has been selected as another possible source area based on historical information, previous analytical data, the lack of data from properties other than 2824 Hitchcock Avenue, and the lack of data about conditions within the building footprints.

- Subarea K - this subarea has been selected as another possible source area based on historical information and the lack of overall data within 5300 Belmont Road.

- 2500 Curtiss Street - this property has been selected for further investigation based on previous analytical data around the perimeter of this property and the lack of data from the interior of the property and building.

- Property South of the Intersection of Curtiss and Glenview and East of Belmont - this area has been selected for further investigation based on previous analytical data.

2.4 KNOWN AND POTENTIAL ROUTES OF MIGRATION

The known and potential routes of migration applicable to the Ellsworth Industrial Park Site include migration within the following media: groundwater, surface water, sediment, and soil. The subsections presented below discuss each of the media separately.

2.4.1 Soil

Chlorinated solvent contamination present in soil at the Ellsworth Industrial Park Site can migrate through the soil, from soil to groundwater, and from soil to surface water, and from soil to air.

2.4.1.1 Migration Within Soil

Existing soil contamination can migrate within the soil by vertical movement of the DNAPL (if present), movement of dissolved contaminants within precipitation, and volatilization. The DNAPL (if present) can migrate through permeable layers or seams within the site geology. The contaminants within the soil can also migrate within soil by being dissolved in precipitation, transported within the migrating precipitation, then sorbed onto other soil particles. In addition, contaminants within the soil can volatilize and migrate within the soil through pore spaces.

2.4.1.2 Migration from Soil to Groundwater

Existing soil contamination can migrate from the soil to groundwater by vertical movement of the DNAPL (if present) and leaching of contaminants from sorbed particles into groundwater. Existing soil contamination (as DNAPL) can migrate from the unsaturated zone to the saturated zone through permeable layers or seams within the site geology. Also, contamination sorbed onto soil particles can leach out and migrate vertically from the unsaturated zone to the saturated zone.

2.4.1.3 Migration from Soil to Surface Water

Existing soil contamination can migrate from soil to surface water through precipitation run-off. Contamination within surface water run-off can be transported through the physical transport of soil particles with sorbed contaminants or through contamination dissolved in the run-off.

2.4.1.4 Migration from Soil to Air

Existing soil contamination can migrate from soil to air through volatilization. Volatilization is a process where a dissolved sample is converted from a liquid into a vapor by heating or a reduction in pressure. Contamination that is volatilized within surface soils can migrate into the ambient air or into an indoor air environment through vapor intrusion pathways. Contamination that is volatilized within subsurface soils can migrate within the unsaturated zone.

2.4.2 Groundwater

Chlorinated solvent contamination present within the groundwater (shallow, intermediate, and bedrock) at the Ellsworth Industrial Park Site can migrate downgradient within the groundwater, and can also migrate vertically between the shallow, intermediate, and bedrock aquifers.

The mechanism by which chlorinated solvent contamination is found within the bedrock aquifer at significant distances downgradient of the industrial park can be theorized based on existing information. Based on a south-southeast bedrock groundwater flow direction and the spatial distribution of PCE and TCE detected in residential wells, a source(s) within the industrial park is suspected. Residential wells upgradient of the industrial park and west of the industrial park do not contain PCE or TCE, effectively delineating the overall extent of the plume and confining it to a source(s) within the industrial park, and separating the plume from other nearby groundwater plumes west of I-355.

Although a specific contaminant migration route between suspected sources and the bedrock aquifer may be difficult to pinpoint due to localized heterogeneity and the complex migration characteristics of denser than water solvents, it appears a complete pathway for migration of contamination to the bedrock aquifer within the industrial park exists within the alluvial deposits in the vicinity of St. Joseph Creek. In these areas, direct vertical migration of PCE/TCE contamination is viable.

Previous investigations indicated thick sequences of low permeability silty clay to depths approaching 100 feet bgs in the southern portion of the industrial park with only scattered discontinuous occurrences of sand and gravel lenses. Based on this information, the likelihood of a PCE/TCE release from this area of the site migrating vertically to the bedrock aquifer is low. In these areas, it is more likely that source PCE/TCE has traveled laterally through surface routes including ditches, swales, and/or the comprehensive storm sewer system within the industrial park to points nearer St. Joseph Creek where a connection between overburden and bedrock is present. In addition, prior to storm sewer development, previous surface drainage ditches and culverts could have provided a similar pathway. Alternately, or in combination with these routes, limited connection between scattered sand and gravel lenses is possible and may act as a lateral migration route as well.

Once contamination enters the Silurian dolomite aquifer vertically from overburden materials, contaminant transport is expected to be governed by fracture flow processes. Although contaminant transport in fractured media is governed by the same processes as in granular media (e.g., advection, dispersion, diffusion, etc.), the effects differ. A weathered zone is typically present in the first 10 to 25 feet of the bedrock where appreciable secondary permeability may be present in the form of fractures or openings along bedding planes, joints, and solution cavities. In fractured carbonate formations, the presence of contamination encountered by a well bore can differ dramatically over very short distances and depends on the interconnection of water bearing secondary permeability features. These conditions may be present under the industrial park as evidenced by the presence of alternating clean (PCE/TCE non-detect) wells, and wells containing TCE/PCE at varying levels along the flow path. Additionally, contaminated residential wells south of the park are expected to have been typically constructed as open hole wells to depths of 150 feet bgs or more. These wells would be expected to intersect significantly more interconnected fracture zones resulting in more uniform detection (albeit potentially diluted) compared to monitoring wells installed during previous investigations which are screened in the upper 15 to 20 feet of the bedrock aquifer.

2.4.3 Surface Water

As discussed above, some of the chlorinated solvent contamination could have migrated through ditches, swales, and/or the comprehensive storm sewer system from the industrial park to St. Joseph Creek. The contamination could then migrate within the creek, migrate to the sediment within the creek, or migrate to groundwater through the creek or surrounding areas.

2.4.4 Sediment

Chlorinated solvent contamination, if present in sediment, would either be trapped in the sediment pores (residual saturation) or sorbed to the surface of the soil particles (sorption). This contamination, if present, could continue to migrate by dissolving in the surface water.

2.5 EXPOSURE PATHWAYS AND RECEPTORS

2.5.1 Human Health

The potential applicable human health exposure pathways associated with the Ellsworth Industrial Park Site originate from the following media: groundwater, surface water, sediment, soil, and air. The exposure pathway associated with groundwater is ingestion of groundwater. The primary contamination exposure route is through ingestion of groundwater obtained from residential or municipal groundwater wells. Currently, this exposure pathway is incomplete, because the nearby residents' residential wells are reportedly no longer in use. The Village of Downers Grove is currently supplying municipal water to the nearby residents. This municipal water supply uses Lake Michigan as its source of potable water. The potential exposure pathways associated with surface water is ingestion of surface water and ingestion of fish pathways. The potential exposure pathways associated with sediment include direct contact and indirect exposure through the food chain. The potential exposure pathways associated with soil include inhalation of dust, ingestion of soil, consumption of home-grown produce, and migration to groundwater. Potential exposure pathways for soil can also vary according to land use classification, and can vary between residential, recreational, and commercial/industrial. The potential exposure pathways associated with air is inhalation of contaminated air, either through ambient air or from indoor air. The primary contamination exposure route is through vapor intrusion into structures adjacent to chlorinated solvent contamination.

2.5.2 Ecological

The potential applicable human health exposure pathways associated with Ellsworth Industrial Park Site originate from the following media: surface water, sediment, soil, and air. These media can lead to direct organism exposure through ingestion or inhalation. In addition, indirect organism exposure can occur through the food chain.

SECTION 3

DATA GAPS ANALYSIS

This section summarizes identified data gaps and/or limitations that may have potential impact on future remedial actions and/or selection of soil, groundwater, or surface water performance standards protective of human health and the environment. The following subsections summarize identified data gaps and limitations based on available data and the CSM.

3.1 SOURCE CHARACTERIZATION

Although Subsection 2.3 examines the potential sources of chlorinated solvent contamination for the Ellsworth Industrial Park, many data gaps still exist. Many of the potential sources are believed to be associated with chlorinated solvent contamination in soil. In order to fully characterize the potential sources associated with soil contamination, the extent of contamination, both vertical and horizontal, must be determined. As discussed below in Subsection 3.3, the vertical and horizontal extent of contamination is not defined at multiple locations and depths throughout the site. In addition, many areas in close proximity to elevated levels of contamination, especially within the footprints of buildings, have not been fully characterized, which indicates a data gap within the source characterization.

Some of the potential sources are believed to be associated with groundwater within the shallow and intermediate groundwater. As illustrated in Figures 2-33 and 2-34, the extent of the groundwater plumes that may be characterized as potential sources have not been fully delineated. Therefore, the data gap associated with the inadequate delineation of the groundwater contamination within shallow and intermediate groundwater is also considered a data gap regarding source characterization.

Also, the final data gap associated with source characterization can be attributed to the inadequate geologic and hydrogeologic characterization of the site, which will be discussed further below. Adequate characterization of the site's geology and hydrogeology is important to determining the potential sources of contamination for many reasons, including the following: plume tracking based on groundwater flow direction and velocity; vertical migration pathways between aquifers and vertical flow velocity; the presence or absence of confining layers near, above, or below contamination that can be considered a potential source; and the presence or absence of permeable layers that may create preferential pathways for contamination to migrate from source areas to throughout the site.

3.2 GEOLOGIC AND HYDROGEOLOGIC CHARACTERIZATION

While previous investigations by IEPA, U.S. EPA, and others have generated a substantial body of geologic and hydrogeologic data since 2001 from areas within and surrounding the Ellsworth Industrial Park, many aspects of the geologic and hydrogeologic system contain varying levels of uncertainty. Additional information will be required to gain a more complete understanding of these systems and how they relate to contaminant migration and preferential pathways throughout OU1, as well as in the surrounding study area (OU2). Specific data gaps identified upon completion of the CSM include the following:

- Thickness of silty clay till deposits - The silty clay till deposits throughout OU1 have only been fully penetrated at limited locations within the industrial park. It is has been concluded that the till deposits are likely thickest in the southern and northern portions of OU1 away from St. Joseph Creek based on limited data. A few locations have encountered bedrock and/or additional sand and gravel deposits at depth; however, the boundaries of these contacts have not been determined everywhere, including underneath those areas identified as potential source areas. Characterization of the till deposits throughout their entire thickness will allow further evaluation of geologic structures which have an impact on groundwater flow and potentially contaminant transport directly underlying potential source areas. It is recommended that the lithologic data be gathered at select locations in OU1 throughout the entire thickness of the overburden deposits to more fully evaluate this aspect of the geologic system.

- Lateral and vertical extent of granular deposits - Previous investigations have determined there to be a significant presence of more transmissive sand and gravel deposits along the approximate axis of St. Joseph Creek; however, the lateral and vertical extent has not been adequately defined and evidence indicates these deposits may finger into cohesive clay deposits to the north and south and end abruptly.

These deposits, due to their presence underlying potential source areas and apparent contact with underlying bedrock, likely represent a significant groundwater flow feature and migration pathway requiring additional evaluation both site-wide and within individual study subareas.

- Continuity of silt/sand/gravel seams and layers within silty clay till - Fine grained sediments generally encountered in the upper 10 to 30 feet of the soil column contain variable amounts of granular silt/sand/gravel materials scattered throughout. Data has indicated that over relatively small areas, these seams and layers may be interconnected to some extent, but the degree is uncertain. Also not fully understood is the relationship of these small lithologic facies to the more massive sand and gravel deposits along the axis of St. Joseph Creek or more uniform sand and gravel deposits between the till and underlying bedrock. These units may play a significant role in contaminant migration and preferential pathways dependent on saturation characteristics. Additional evaluation will be required on a study subarea basis to determine the presence and extent of perched groundwater systems within the finer-grained glacial tills and their relationship to other water bearing units within OU1.

- Bedrock characteristics - Minimal data has been collected on the bedrock elevations within OU1 and surrounding areas and the bedrock surface topography is not well understood. Bedrock surface contours may play a role in contaminant transport if significant erosional features are present, specifically, if product in the form of DNAPLs are present. Additionally, the physical characteristics of the upper portions of the bedrock aquifer have not been evaluated. Specifically, the presence or absence of weathering, jointing, and/or fractures which result in secondary permeability and preferential pathways for contaminant migration.

- Groundwater flow regime - The CSM presents historical water level data and potentiometric surface information to evaluate the presence of groundwater as well as hydraulic characteristics of the three water bearing zones. As concluded in the CSM, the groundwater flow regime is complex and variable, especially within glacial till sequences. Given the current information available, limited conclusions can be drawn regarding groundwater flow directions, gradients, and seepage velocities. While the regional bedrock aquifer flow direction is south-southeast, significant variation is present within OU1 due to the presence of apparent mounding effects which alter flow locally. Similarly, potentiometric head data within the intermediate aquifer is limited and results in an apparent complex flow system with groundwater mounds and troughs. The potential presence of troughs and converging groundwater flow directions in the central portion of the site coincident with St. Joseph Creek area may indicate that primary groundwater flow directions alternate from lateral flow in the distal portions of the site to a more vertical flow down into the bedrock aquifer which is in direct hydraulic communication in this area. This mechanism is not well understood and is deemed significant with respect to contaminant migration from potential source areas. Quantifying vertical gradient data will allow these characteristics to be more fully evaluated. Additionally, the presence of groundwater within the upper glacial till unit has been documented and likely represents a perched groundwater flow system. The presence and hydraulic characteristics of this perched system is not well understood. Attempts to contour head data from monitoring wells known to be installed in the perched system yield conflicting flow data leading to the conclusion that interconnection and hydraulic communication of these units may only be local in extent. However, based on the presence of contaminants at significant levels within some of these perched layers at specific study subareas, requires that additional characterization be conducted to evaluate whether locally, these units may be connected to the more prominent intermediate aquifer materials in some fashion, thereby requiring potential remedial action. Permeability data on the three water bearing zones has not been collected to date and is recommended. These data can be collected at strategic locations using hydraulic conductivity testing and shelby tubes in more cohesive soil. Finally, while multiple groundwater measurement events have been conducted in association with various previous exercises, a comprehensive event has not been undertaken including all known monitoring wells. Previous events indicate that seasonal variation in flow directions is likely, but this has not been fully evaluated with respect to contaminant migration.

- Status of municipal wells - Downers Grove municipal water well #10 is located within OU1 and is a 285 foot deep production well open to the Silurian Dolomite aquifer. This well was sampled during the Phase II SA and did not contain primary or secondary chlorinated solvent compounds. This well was reportedly used as a backup well to the municipal water delivery system. However; the presence of this well, and assumed open bedrock borehole construction, represents a potential conduit for migration of shallower contaminated groundwater in OU1. Additionally, during times of pumping, contaminated groundwater may be drawn to this location via pumping influence. Some information has indicated that this well may have been abandoned. The Village of Downers Grove should be contacted to determine the status of this well. The presence and status of other municipal wells in OU2 or surrounding areas should also be investigated.

3.3 EXTENT OF CONTAMINATION

3.3.1 Soil

As presented in Section 2.2.1.1, the extent of contamination has been estimated both horizontally, in Figures 2-16 through 2-26, and vertically, as discussed in the text. Data gaps exist in both the horizontal and vertical extent of contamination. The data gaps present in the vertical extent of contamination for soil are summarized in Table 3-1. The interpolated horizontal extent of horizontal contamination, which is illustrated in Figures 2-16 through 2-26 was estimated using analytical data and field-screening data. Although the horizontal extent of contamination has been estimated on Figures 2-16 through 2-26, many data gaps still exist as the distance between data points can be significant.

3.3.2 Groundwater

3.3.2.1 Shallow

As discussed in the CSM, shallow groundwater generally consists of saturation within seams and layers in the predominantly lower permeability glacial tills throughout the study area. While significant contamination is present within this overall horizon, the degree of interconnection is not known, thus the extent of contamination may be under- or overestimated at this time. Additionally, the delineation (Figure 2-33) is also based on indirect evidence in that demarcation lines were included for areas that groundwater was not encountered during grab groundwater sampling. This may or may not accurately reflect the presence of groundwater since limited time was allotted for sample locations to generate groundwater.

3.3.2.2 Intermediate

Two of the three primary chlorinated solvent plumes illustrated on Figure 2-34 are extremely large, and numerous locations exist with concentrations that are orders of magnitude greater than the preliminary screening criteria. The first data gap related to the extent of contamination of intermediate groundwater is the spacing of sample locations. Additional intermediate groundwater sampling should be collected to more accurately determine the extent of contamination of each of the three plumes, and to also determine if the plumes are interconnected. The second data gap related to the extent of contamination of intermediate groundwater is the lack of sufficient samples to adequately determine the extent of the areas where groundwater concentrations exceed the preliminary screening criteria by orders of magnitude.

3.3.2.3 Bedrock

The primary chlorinated solvent contaminant plumes illustrated on Figure 2-35 are extremely large, and the number of samples collected from the bedrock groundwater is extremely low. The major data gap related to the extent of contamination of bedrock groundwater is the low number of bedrock groundwater samples collected. Additional bedrock groundwater sampling is required to accurately determine the extent of contamination.

3.4 FATE AND TRANSPORT

Although no fate and transport analysis is being prepared as part of the Preliminary Planning Report, this modeling will be required during preparation of the RI. The data gaps associated with the future fate and transport analysis will include the following: the unknown processes controlling reductive dechlorination at the site, the presence of breakdown products from the reductive dechlorination process present at some areas of the site, but not at other areas, the unknown degradation rates associated with reductive dechlorination processes occurring at the site, and the lack of data to be able to perform modeling of contaminant transport within the groundwater. The data gap associated with the unknown reductive dechlorination process and the rate of this process is related to the lack of data collected for these purposes during previous investigations. The data gap associated with the sporadic presence of breakdown products is related to the overall data gap in the chemical characterization of the site discussed in Subsection 3.3. The data gap associated with the inability to model contaminant transport at the site is related to the overall data gap in the geologic/hydrogeologic characterization of the site.

3.5 MISCELLANEOUS

An additional major data gap identified is the lack of subsurface utility locations within the Ellsworth Industrial Park. Granular fill within subsurface utility corridors can frequently be preferential pathways for subsurface contamination. In addition, past activities at facilities within the Ellsworth Industrial Park may have released chlorinated solvents to the storm water system, which may be another means by which chlorinated solvent contamination has migrated throughout the site. During the RI/FS, information regarding subsurface utilities should be obtained from the Village of Downers Grove, DuPage County, individual utility companies, and facility owners. For example, information related to the following should be obtained: public sewer and water lines, underground electric and natural gas lines, and underground structures (discharge lines, oil-water separators, sumps, drains, etc.) within or near facilities within the industrial park. Facility chlorinated solvent operational information has also been very limited in availability and should be compiled and reviewed for each study subarea.

SECTION 4

PROJECT OBJECTIVES AND TECHNICAL APPROACH

This section outlines the project objectives and technical approach for the upcoming RI activities to further delineate potential source areas and to support design of mitigation and remedial strategies for soil and groundwater beneath OU1 of Ellsworth Industrial Park. Contaminant distributions outside the OU1 boundary have been used to target release areas from OU1 and to design and target characterization activities within OU1. However, characterization of contaminants outside of OU1 is not within the scope of the upcoming investigation.

4.1 OVERALL GOALS AND STRATEGIES FOR THE SITE

The overall goal for the Ellsworth Industrial Park Site is to fully characterize the chlorinated solvent contamination previously identified; determine an effective and cost efficient remedial action; and perform the selected remedial action at the site. This overall goal will be accomplished in a sequential fashion, including the following:

- Characterize Contamination - This phase will be completed by identifying the data gaps within the existing data and performing an investigation to obtain data necessary to fill the data gaps.
- Determine Remedial Action - This phase will be accomplished by the preparation of a Feasibility Study, which will examine potential remedial alternatives, and determine the remedial alternative that is best suited for the site.
- Perform Remedial Action - This phase will be accomplished by the implementation of the Remedial Action.

Because the PPR primarily deals with the characterization of the contamination at the site, the following subsections will not examine how the Remedial Action will be determined or how the Remedial Action will be performed.

4.2 OBJECTIVES AND TECHNICAL APPROACH FOR THE REMEDIAL INVESTIGATION

Objectives that have been established for the OU1 RI by the Ellsworth Industrial Park stakeholders include:

- Further delineation of potential source areas found during previous investigations
- Identification and delineation of other potential source areas that have not been previously characterized by U.S. EPA or IEPA
- Delineation of soil contamination above RAOs
- Delineation of groundwater contamination above RAOs
- General refinement of the CSM for OU1, with specific attention to the effects of OU1 potential sources on OU2 groundwater

The overall goal for the RI is to delineate potential chlorinated solvent source areas present within OU1 that could act as a continuing source of contamination in groundwater, and gather sufficient information to assess effective remedies for the contamination that are protective of human health and the environment. The delineation of the pathways from the potential source areas to the bedrock aquifer system and the distribution of contamination in the bedrock aquifer are also goals for the RI, such that mitigation and remedial alternatives can be evaluated and the groundwater quality of the aquifer can be restored. Chlorinated solvent contamination of drinking water in residential areas surrounding OU1 has produced a need for alternative sources of drinking water for the residences downgradient of the site which has been completed. To restore groundwater quality in the area surrounding OU1, it will be important to thoroughly understand chlorinated solvent sources within OU1, as well as potential release mechanisms or preferential pathways. For example, contaminated utility corridors or drain lines could be acting as on-going sources of contamination, and preferential pathways for the infiltration of surface water could be acting to drive contamination into the underlying bedrock aquifer.

The technical approach proposed for use at the site utilizes the principles of the Triad approach. The Triad approach is a U.S. EPA streamlining initiative where detailed systematic planning processes, based on an evolving CSM, are used to develop and optimize project activities. Activities are sequenced to limit the size of field crews and the need for exhaustive, unfocused sampling and analysis efforts. The Triad approach also promotes the use of innovative field based methods to improve the quantity and quality of information available to support decision making. Data of various types are used collaboratively to refine the CSM and thus focus sampling efforts and reduce overall project costs.

The current information available for the site has been compiled into a preliminary CSM that is described in detail in Section 2 of this PPR. For purposes of this PPR, the technical approach to the Ellsworth Industrial Park site includes the following:

- Limited further data compilation and review focusing on gathering missing or pertinent information as discussed in Section 3, if available (e.g., facility operational data, data from investigations performed by other parties, etc.).
- Preliminary utility corridor and soil vapor survey.
- Subsurface soil investigations.
- Groundwater investigations.

This further data compilation effort would also be combined with continued analysis of existing soil boring data and related chemical results to further refine the CSM in specific study subareas. The refined CSM will then be used to implement a streamlined approach to further characterization of soil and groundwater at the site. The PPR has developed some preliminary ideas concerning where additional work is needed and the general tools and technologies that might be considered based on the significant level of uncertainty associated with the current understanding of site conditions.

4.3 IMPLICATIONS OF THE CSM FOR THE DYNAMIC WORK STRATEGY

Data from previous investigations at the site has provided information on data gaps to be addressed during the OU1 RI and where investigation activities should be focused. Considerations from the existing geological and hydrogeological data for the technical approach of the RI are summarized in the following subsections.

4.3.1 Geology

As described in Section 2, the site geology is complex. Figure 4-1 shows the percentage of sand deposits in the unconsolidated sediments across the site. These deposits lie within the fluvial and glacial sediments that comprise the overburden overlying the fractured dolomitic bedrock sand sequence beneath the site, which is the regional aquifer system of interest. As can be seen from the sand isopach map (Figure 4-1), portions of the site have significantly more sand content than others. In most locations, as indicated in the cross sections presented in Section 2, fine grained sediments in the upper 10 feet of the sedimentary sequence give way to more sand-dominated zones along an axis that approximately parallels St. Joseph Creek. The increase in sand content and the complexity of the relationship between sand lobes within the section suggests that the deposits are somehow related to changes in the surface water drainage channel over time. The sands in this sequence are even incised by the modern stream in certain locations. These areas represent corridors where infiltration rates are likely to be the highest and where contaminant releases may be moving most rapidly into the underlying bedrock system. Along the eastern edge of OU1, the presence of thicker sands may also provide a preferential pathway for contaminant migration eastward from the site into OU2.

Inspection of cross sections located along the southern half of the site, along with further review of the sand isopach map, suggests that the predominant overburden sediment type in the southern third of the site consists of finer-grained glacial till materials. These sediments are relatively unconsolidated and poorly sorted, which has resulted in poor core recoveries during previous investigations. These sediments are generally less transmissive than sandier sediment packages at the site, such that limited releases of chlorinated solvents would remain localized with low potential to migrate to the bedrock aquifer. However, more significant releases may still migrate downward to groundwater as DNAPLs through the poorly sorted silty clays. Moreover, the fine-grained nature of these sediments allows them to absorb significant quantities of contaminants and act as potential long term sources.

Variations in the geology will have a strong influence on contaminant migration and the location of preferential pathways across the site. In order to better understand the lithology present across the site, it is suggested that sonic drilling methods and consistent logging procedures (i.e., Unified Soil Classification System) and conventions be used during future investigative efforts to improve core recoveries and assure the consistency of observational data that will be used by the project team to further delineate preferential pathway configurations.

4.3.2 Hydrogeology

The hydrogeology at the site is similarly complex, with a series of perched groundwater system that result from interbedded fine-grained layers which pinch out abruptly, creating trapped water pockets and locally variable flow directions within the shallow groundwater system. These locally perched groundwater systems may or may not have an influence on the migration of contaminants. Contaminant distributions observed at the site as examined in combination with boring logs do not suggest the presence of a continuous plume of dissolved phase contamination beneath the site. This observation should be confirmed during initial phases of the RI through the preparation of detailed cross-sections for each potential source subarea as additional data is gathered.

As mentioned previously, the dolomite bedrock aquifer is suspected to be highly fractured. An examination of the correlation between topographic highs in the bedrock (Figure 2-2) and potentiometric highs in the bedrock aquifer (Figures 2-10 through 2-12) suggests that the dolomite aquifer is behaving as if it were a porous medium. Based on these considerations, it appears as though contamination is primarily migrating vertically downward rather than laterally because of the discontinuous nature of the sands and the fine grained nature of the glacial sediments in the overburden, specifically in the vicinity of St. Joseph Creek. Transmissivities are expected to be low in the glacial sediments present over large portions of the site. Furthermore, the observed sporadic and discontinuous distribution of contaminants at the site suggests that contaminants are migrating primarily downward from potential source areas to the bedrock aquifer where they are rapidly transported off-site into the surrounding residential properties.

4.3.3 Contaminant Distribution

In general, it is very difficult to track lithologic units and contaminants laterally or vertically at the site, particularly in the central and northern portions of the site. One observation is that the majority of soil contamination was found at a depth of 9 to 10 feet bgs or greater. This suggests that release mechanisms could be related to buried utility corridors, sumps, sand and grease traps surrounding or inside the buildings. This observation has potentially large implications concerning the tactical approach for future investigative activities. Because the CSM for contaminant release may be related to drains, sumps, or sewers, these features should be mapped and the vapors sampled to assess their potential as past and ongoing sources. An advantage of focusing on these types of release mechanisms is that they can be easily traced and sampled accordingly. Once identified as potential sources, further sampling and analysis activities can be focused and thus reduce the overall scope of the RI.

4.4 PROPOSED DYNAMIC WORK STRATEGY

4.4.1 Study Areas and Refinement of the CSM

Based upon the above considerations, a general approach to characterization of the potential source areas has been developed. Potential source areas were introduced in Section 2.3, which contains descriptions of each subarea. Individual properties and or study subareas will be investigated in a sequential fashion. This sequential approach is intended to limit crew size and limit the need for separate mobilizations. As new information becomes available for any one of the study subareas, information will be input into work products such as maps or other visual aids to refine the CSM. Continually updated in this manner, the CSM will be used to guide where additional information may still be required. Decisions made by the field team will be based on the evolving CSM to ensure that all data is collected from areas where further characterization or delineation is required. Generated data and revised CSM work products will be posted to a secure website to keep stakeholders informed of results as they are received, processed, and used to make decisions. The U.S. EPA FIELDS team will also access the website to add the investigation data to the site database as appropriate. This continuously updating process allows the project to progress with the least amount of interruptions. Using properly sequenced field activities under a unified, site-wide approach and communication strategy will assure maximum project efficiency and reduce project costs.

The RI planning documents (QAPP/FSP) will outline how the data gathered in the sequenced activities will be used to make decisions, and any associated decision rules or criteria that will be applied. These decision criteria will guide the field team as to when additional data is needed or when a specific delineation activity is complete. Quantitative decision criteria are not envisioned for the initial vapor investigations that are anticipated, because vapor is not a primary medium of concern during the OU1 RI. Rather, the data from the vapor sampling programs will be applied qualitatively to resolve and refine the study areas and initial sampling locations for subsequent investigation activities.

For the soil and groundwater investigations, however, quantitative decision criteria will be used to determine when the nature and extent of contamination has been delineated. These decision criteria will be based on the RAOs established for OU1. Some of the field methods proposed for the soil and groundwater investigations will provide data that is not directly comparable to the RAOs. In these cases, either initial method applicability demonstrations will be used to correlate the instrument readings with standard laboratory data and hence the RAOs, or field-based decision concentrations may be refined in the field as data is collected and the performance of the field methods are better understood. This will enable field-based decision-making during the investigation within each of the subareas.

4.4.2 Utility Corridor Investigation

A utility corridor evaluation targeting features such as sump, sand, and grease traps will be performed initially to evaluate potential sources and releases that may not have been identified during previous investigations. This preliminary survey would be designed to further assess the significance and potential extent of current sources, and of other potential source areas encountered. The survey would begin with data gathering that would include existing drawings of utility corridors, geological and hydrogeological data from prior site investigations, and other historical information concerning site use and potential release points. The project team will compile all available existing drawings and other available information to identify where potential releases from site structures could have occurred in the past. If sewer and utility system drawings are not available, the project team will inspect properties and work with property owners/operators as appropriate to evaluate the need for utility corridor surveys. A real-time measurement technology based on established U.S. EPA methods for VOCs (i.e., gas chromatography [GC] methods) will be used to sample fumes from manholes, drain lines, sumps, traps, etc., to identify where a potential for contamination and release may exist. As appropriate, down-drain camera surveys and drain-line radio tracking surveys may also be used to locate and inspect suspected drain line sources.

As noted above, existing analytical data indicates minimal surface sources at the site and suggests that releases may have been from below ground surface or under buildings. Understanding and targeting areas surrounding utility corridors is seen as essential to refine the need for and location of any further intrusive sampling and analysis locations, including soil vapor, soil, and groundwater studies. When this information is obtained and properly processed, the project scope may be altered as necessary to reach the project objectives.

The utility corridor investigation should employ a HAPSITE mobile GC/mass spectrometry (MS) equipped with a real-time vapor sampling wand. This system is available for purchase or rental from the manufacturer, Inficon, Inc. In addition, field analytical services that provide the HAPSITE along with an operator are available from a number of vendors. The HAPSITE incorporates the features of laboratory bench-top GC/MSs on a highly portable platform, including a temperature-programmable GC, quadruple MS, sample concentrator trap, National Institute of Standards and Technology (NIST) mass spectral library searches for unknown chemicals, and full data reduction and reporting software. Target chemicals for the survey will be PCE, TCE, TCA, PCM, and associated chlorinated solvent breakdown products.

It is anticipated that the HAPSITE will be deployed using its pre-concentrator trap to reach detection limits in the low ppb to ppt range. Run times for these types of samples are in the range of 15 minutes, and a conservative sample throughput of more than 20 samples per day is achievable. However, initial pilot tests during the mobilization will assess the utility of real-time measurements bypassing the pre-concentrator trap and operating the instrument in selected ion monitoring (SIM) mode to decrease sample analysis times and further increase sample throughput. Collection of collocated grab vapor samples in Summa canisters for off-site analysis by EPA Method TO-15 can also be contemplated as collaborative or quality assurance/quality control (QA/QC) check data for the HAPSITE results.

4.4.3 <u>Sub-Slab Monitoring</u>

The project team will conduct limited sub-slab monitoring in selected buildings. Sub-slab locations will be selected based on the information collected during the utility survey and soil gas investigations outlined above, along with data or information from previous investigations that indicate potential sources beneath buildings. The objective of this monitoring program is to identify if major sources exist below select buildings. Sub-slab vapor points will be placed in locations based on available historical information (if any) and will use the same EMFLUX technology and methods that will be used for soil vapor. The exact location and numbers of sub slab samples will be reevaluated once the results for the utility corridor survey has been processed. Sample depths will be determined based on conditions observed during the investigation, but it is assumed that sub-slab monitoring samples will be collected from the granular material located beneath the building slabs.

4.4.4 Passive Soil Gas Survey

During soil gas surveys that will be conducted as part of the investigation, each of the subareas will be examined using passive soil gas probes. Grids and linearly aligned arrays of sorbers will be placed to target utility corridors of interest as identified from the utility corridor survey, or designed to help delineate contamination spreading outside building footprints or around known hotspots. (That is, the sorbers will be placed strategically based on the evolving CSM for a particular subarea). Some probes may be advanced to variable depths below ground surface to be placed adjacent to utility corridors or below surface layers of fine grained sediment to expand the capture radius of the sorber. Grid density or spacing along a linear array may be variable based on available lines of evidence to provide the best coverage in areas where uncertainties are the greatest. Sorber equilibration times and placements will be sequenced such that some can be removed while others are being placed to limit the need for multiple mobilizations. Soil gas results will be used to select where additional intrusive drilling and sampling of soil and groundwater is warranted.

Passive soil gas was identified as the preferred alternative for use at the site because it provides a high level of sensitivity for chlorinated solvents, which are the focus of the upcoming investigation. Passive soil gas sorbers are economical to install and analyze, and they can provide information concerning contamination at depth as well as close to the surface. The proposed technology for soil vapor collection is the EMFLUX adsorbent sampling system. The technology consists of the EMFLUX field collector, which includes a cartridge of hydrophobic sorbent sealed in a fine-mesh screen within a glass vial. The collector is inserted into the soil to the prescribed depth with the help of a direct push rig and then covered to prevent exposure to ambient contamination. It is anticipated that the direct push rig use will be minimal, and that the majority of samples will be collected from depths where manual installation is possible. The collector is allowed to equilibrate with the subsurface for three days, after which it is retrieved and sent for analysis at the vendor's laboratory. The laboratory uses a thermal desorption GC/MS method based on EPA Method 8260 to analyze the sorbent cartridge for adsorbed VOCs. The EMFLUX system also includes computer modeling by the vendor to predict optimal sampling times based on periods of maximum soil gas emissions assessed from gravitational earth tides.

Installation of EMFLUX collectors will require a direct push rig and the ability to core through concrete or asphalt at some locations. Because the EMFLUX is a proven technology with documented success at sites similar to the Ellsworth Industrial Park, an initial pilot demonstration of the method may not be required prior to the investigation to ensure data usability. Target analytes will include PCE, TCA, TCE, and PCM, as well as their daughter products. Data quality will be assessed through QA sampling (duplicates, collocated samples, blanks) and correlations with collaborative tools (e.g., real-time vapor sampling methods and TO-15 analysis used for the utility survey).

4.4.5 Soil Sampling

Once potential source areas have been identified using the above mentioned activities and the CSM has been refined, the project team will delineate areas of contamination and preferential pathways for potential sources to reach the bedrock aquifer. Direct push, sonic or EP-sonic drilling methods coupled with real time analyses on a high density of samples will be conducted using EPA Method 8265 or the equivalent. Method 8265 analyzes headspace above discrete soil samples using direct sampling ion trap mass spectrometry (DSITMS). This method allows for the rapid analysis of many soil samples per day while achieving very low reporting limits (low part per billion range) for chlorinated solvents. Historical information suggests that potential sources across the site are generally localized and may or may not be indicative of the presence of DNAPLs. MIP analyses, sensitive to chlorinated solvents down to the low part per million range, have generally had limited success in delineation of potential source areas and were only used to determine the presence of potential source materials during previous investigations. Therefore, Method 8265 is recommended as a more sensitive and selective method for sensing chlorinated VOCs during the upcoming investigation. Sonic drilling methods are also the preferred method, as mentioned above, over direct push or traditional drilling methods to improve sample recoveries and to allow the advancement of borings down to and into the bedrock aquifer as needed in the varied geological conditions encountered across the site. However, sonic drilling methods can be cost prohibitive when completing a large investigation, so some combination of direct push, traditional drilling, and sonic drilling will be used at the site. In addition, direct push MIP equipment will remain accessible as a contingency if concentrations are encountered that range too high for effective characterization by the DSITMS method.

Samples will be selected along the individual soil cores for DSITMS analysis through inspection and the use of a photoionization detector (PID). For maximum sensitivity and selectivity, the mass spectrometer applied in the DSITMS method will be adapted to focus on fragmentation ions associated with the primary contaminants of interest (PCE, TCA, and TCE). The initial stages of the soil investigation will demonstrate the applicability of the DSITMS method at the site through the analysis of headspace, calibration, and QC check standards, as well as off-site comparative analysis by EPA Method 8260 at a fixed laboratory for a subset of the samples. The project team will use the collaborative Method 8260 data and/or soil geotechnical data to establish field-based decision levels for the DSITMS method. These decision levels will help the field team delineate areas of the site that are potentially above RAOs and identify the need for additional step-out or step-down sampling to delineate such areas. Such decisions will occur dynamically in the field, and daily posting of data and sample maps to the project website will allow project managers and stakeholders to review the decisions as they are made.

Initial sampling locations will be established based the results of the utility corridor survey, sub-slab sampling, and soil gas investigations, as well as on existing boring logs and analytical results from previous investigations. If the results of the utility corridor survey, sub-slab sampling, and passive soil gas investigations indicate that soil sampling should be completed beneath building slabs, soil borings will be advanced within the perimeter of select buildings. Target sampling depths will also be established based on this information, and are anticipated to vary between potential sources and subareas. As noted previously, initial target zones for characterization may be somewhat below ground surface near utilities and other potential pathways. When soil contamination is believed to be laterally and vertically delineated by DSITMS in a given source area, confirmation soil samples will be collected for EPA Method 8260 analysis for direct verification against RAOs.

4.4.6 Groundwater Sampling

At some locations, the presence of preferential pathways from a potential source area to the bedrock aquifer may be present. The attenuation rates from a potential source area to the underlying bedrock aquifer may be an important factor where large silt deposits separate the potential source from the bedrock aquifer. In other areas, the presence of sands may limit the degree of attenuation of contamination between potential source areas and the bedrock aquifer. Once a potential source has been delineated, several soil borings may be advanced to the bedrock to further delineate the potential source to bedrock pathway and estimate the potential for attenuation of contamination. It is anticipated that most of these soil borings will be advanced at least 5 to 10 feet into the bedrock. At this depth, the soil boring will be terminated and a grab groundwater sample collected in such as way that contaminant concentrations can be measured using EPA Method 8265 (headspace DSITMS). Split grab groundwater samples will also be collected at a high initial frequency for laboratory analysis using EPA Method 8260 (purge and trap GC/MS) until correlations can be developed with the DSITMS method. If a consistent correlation can be established, the frequency of EPA Method 8260 corroborating analysis will be decreased, and DSITMS will be relied upon to a greater extent as a primary field-based decision making tool for delineating groundwater contamination above RAOs.

Based on the soil and groundwater data from the DSITMS investigation, it is anticipated that permanent monitoring wells will be installed in the intermediate and bedrock zones along contaminant migration pathways for initial and periodic monitoring by EPA Method 8260. The monitoring well network will be established to verify and monitor the extent of groundwater contamination that is above RAOs. In addition, special collection methods (e.g., nitrogen purge), field measurements (dissolved oxygen, oxidation-reduction potential, pH, conductivity, temperature, ferrous iron, and manganese), as well as laboratory analyses (major anions, alkalinity, TOC, sulfide, and dissolved hydrocarbon gases) will be used or collected for the assessment of contaminant transport and monitored natural attenuation at the Ellsworth Industrial Park.

The laboratory analytical (EPA Method 8260) data sets collected during the soil and groundwater investigations will also be used in conjunction with geotechnical and geochemical measurements to assess contaminant age and transport. This evaluation will assess approximate migration and degradation rates based on modeling or empirical methods for comparison to the observed ratios of parent solvents to degradation daughter products in the laboratory analytical data. Plotting the parent-daughter ratios versus distance from the potential source areas will be performed as part of this evaluation. In addition, data from new and existing monitoring wells will be compared to historical data along the assessed migration pathways from the potential source areas into OU2 to assess temporal trends and assist in this qualitative assessment of source and plume age.

4.5 INITIAL INVESTIGATION CONSIDERATIONS FOR SPECIFIC SUBAREAS

This section summarizes important features of the CSM and sampling considerations based on the above approach for the subareas identified in Section 2. These considerations are further discussed in Appendix C, which goes on to propose specific initial sample locations and quantities in each subarea to assist in the scoping and costing of the RI. The sampling approaches for the subareas are highly dependent on initial data gathering activities during preparation of the RI planning documents, and on how the sequence of investigation activities will progressively refine the CSM.

4.5.1 Northeastern Subareas A, B, and C

The subsurface geology beneath subareas A, B, and C consists of intermixed lithology (clays, silts, sands, clasts and cobbles) deposited from glacial transport, and includes conductive sand stringers, packages and channels. The proportion of sands is highest near and along St. Joseph's Creek, reaching 80 percent. Depth to fractured dolomite bedrock under these subareas ranges from approximately 65 to 75 ft bgs. Groundwater flow in the intermediate zone is to the south and west, feeding the deeper bedrock aquifer that flows due south, eventually to the OU1 boundary and into OU2. In the extreme eastern portion of Subarea C near the eastern OU1 boundary, however, there may be an easterly component to groundwater flow directly into OU2. Though somewhat below ground surface (8 ft bgs or greater), contaminants in these subareas appear to be confined to shallower depth ranges to the north, and spread over greater depth intervals to the south where the sand sequences are thickest.

Considerations for the investigation approach include:

- The conductive sand zones are generally overlain by surficial clay layers of 5 to 15 feet. These layers could affect the approach and findings of soil vapor investigation activities, and should be addressed in the design of the investigation. For example, slightly longer equilibration times (7 days versus 3 to 4 days) can be used in areas with significant clay layers, and comparisons of soil gas measurements between different areas of the site can take the local geology into account (that is, measurements in silty clay zones may be somewhat lower than in predominantly sandy zones for a similar-sized source).

- Multiple potential sources have been noted by previous investigations across these three subareas, with potential affects on surrounding properties. The soil and soil vapor investigations should provide sufficient data quality and density to find all potential sources of concern and differentiate between potential source properties and non-source properties.

- Soil investigation activities may be able to completely bound soil sources laterally and vertically in the northern reaches of OU1, given that lower migration rates are predicted in the less permeable sediments of this area. Vertical delineation of soil contamination is less likely in the thick sands to the south along St. Joseph's Creek, such that investigation activities should more quickly focus on groundwater.

- Monitoring well placement in the intermediate and deep zones should be targeted to identify contaminants leaving OU1 to the east, and also should delineate or differentiate plumes from those of downgradient sources in the remaining subareas to the south.

4.5.2 Central Subareas E, G, H, and I

The subsurface geology beneath subareas E, G, H, and I is similar to the northeastern subareas; however, conductive sand zones are generally thinner due to greater distance from St. Joseph's Creek. Proportions of sand are generally in range of 20 to 40 percent, increasing above this range to the north and east near the creek. The general groundwater flow direction is to the south, although localized flow components to the east and west have been mapped from a bedrock high beneath the center of Subarea G. Detected contamination in Subareas E and G ranges to shallower depths than in other areas of Ellsworth Industrial Park (less than 10 ft bgs). Subarea G contains multiple potential source areas whereas only isolated contamination has been detected at Subarea E. No contamination has been reported by previous investigation activities at Subareas H and I, although only limited portions of these subareas have been sampled.

Considerations for data collection are similar to the northeastern subareas and include:

- The conductive sand zones are generally overlain by surficial clay layers of 5 to 15 feet. These layers could affect the approach and findings of soil vapor investigation activities, and should be addressed in the design of the investigation. For example, slightly longer equilibration times (7 days versus 3 to 4 days) can be used in areas with significant clay layers, and comparisons of soil gas measurements between different areas of the site can take the local geology into account (that is, measurements in silty clay zones may be somewhat lower than in predominantly sandy zones for a similar-sized source).

- Multiple potential sources have been noted by previous investigations, particularly in Subarea G, with potential affects on surrounding properties. The soil and soil vapor investigations should provide sufficient data quality and density to find all potential sources of concern and differentiate between source properties and non-source properties.

- Monitoring well placement in the intermediate and deep zones should be targeted to delineate or differentiate plumes from those of downgradient sources in the remaining subareas to the south. Other new wells should be placed to better understand groundwater flow and contaminant migration in the western portion of the Ellsworth Industrial Park Site.

- A thorough characterization of Subarea I is required, given historical use of solvents at these properties, minimal historical investigation activities, and the proximity of the subarea to both the Subarea G source properties as well as the southern boundary of OU1.

4.5.3 Southern Subareas D, F, and K

The subsurface geology beneath the southern portion of the Ellsworth Industrial Park is again a composite of glacially tilled sediments including clays, silts, sands, clasts/cobbles, and intermixed lithology indicative of glacially transported materials. However, compared to the northeastern and central subareas, conductive sand stringers, packages and channels are much smaller and more isolated due to the remote and distal location of the subareas relative to modern stream system. The southern subareas generally show only 0 to 5 percent sands to bedrock. Depth to fractured dolomite bedrock is 65 to 90 feet, and groundwater flow is to the south. Significant potential sources have been indicated by previous investigations within Subareas D and F. Potential source areas are unknown within Subarea K.

Considerations for the investigation approach include:

- It is particularly crucial to find and delineate all potential sources and contaminant transport pathways to and within groundwater given that these subareas are immediately upgradient of OU2. The soil investigation may be able to quickly and completely delineate some localized soil source areas in low permeability materials.
- Monitoring well placement in the intermediate and deep zones should be targeted to identify contaminants leaving OU1 to the south in this area. Well construction and locations should be selected to support the evaluation and implementation of remedial actions as well as for characterization.

4.5.4 Western Subarea J

Relative to the other subareas, Subarea J is located in extreme western to northwestern portion of OU1. Geology is similar to the rest of OU1 with between 40 to 60 percent sands. Depth to fractured dolomite bedrock is approximately 65 ft bgs, and groundwater flow is generally to the south/southeast based on limited historical data. No chemical contaminants have been discovered within Subarea J, though subsurface contamination has been detected directly south in monitoring well MW-1601 at a depth of 55 to 60 feet.

Considerations for the investigation approach include:

- Given limited historical data and uncertainties in the findings of previous investigations, the RI should clearly verify the presence or absence of potential sources in this subarea, and the source contaminants in the downgradient well.

- Monitoring well placement in the intermediate and deep zones should be targeted to delineate or differentiate plumes from those of downgradient sources in the remaining subareas to the south/southeast. Other new wells should be placed to better understand groundwater flow and contaminant migration in the western portion of Ellsworth Industrial Park.

4.6 DATA MANAGEMENT AND COMMUNICATION

During the upcoming RI, the amount of data generated will be enormous. Management of this data will be an important aspect, and will require coordination between all stakeholders. Important aspects of the data generation and management during the RI include the following: EQuIS data management software, global positioning system (GPS), electronic data deliverables (EDDs), U.S. EPA FIELDS Rapid Assessment Tool (RAT), U.S. EPA Mobile Geographic Information Systems (GIS) Laboratory. These data management tools will be documented in detail within the RI planning documents. Additional aspects of data sharing and decision-making for the Triad approach that will be used for the RI are further discussed in Section 7.2.

4.7 CONTINGENCIES

Performance of the field-based methods proposed in this section will be verified as appropriate before data are collected. This will be accomplished by method applicability demonstrations prior to the field programs. These demonstrations may determine that the proposed methods will not meet data quality objectives for the RI. In such cases, method modification may be needed or alternative technologies may be selected. Moreover, alternative technologies may be needed if method performance issues or unforeseen site conditions arise during the field program. Thus, the RI planning documents will identify contingencies that can be exercised during the project to ensure data needs are met. Examples of method contingencies that could potentially be applicable to the RI include:

- Additional EMFLUX cartridges to hang in utility corridors and provide vapor data as a contingency for the real-time HAPSITE method.

- Extra coring and direct push equipment on stand-by to install EMFLUX soil vapor or sub-slab samples at sufficient rates.

- Mobile GC/MS laboratory (such as the U.S. EPA Region 5 mobile laboratory) as a contingency for the DSITMS method to support the soil and groundwater investigation.

In establishing such contingencies, the project team will likely identify and pre-approve subcontractors, understand approximate costs, and verify availability for the potential replacement or supplemental technology.

TABLES

T. .-1
Ellsworth Industrial Park Property Information
Preliminary Planning Report
Ellsworth Industrial Park
Downers Grove, Illinois

PROPERTY ADDRESS	PIN	CURRENT OWNER NAME	CURRENT TENANTS OR OCCUPANTS	PREVIOUS OWNER(S), TENANTS, OR OCCUPANTS
5240 Belmont Rd	0812407011	Arrow Bldg Corp	K&C	Arrow Building Corp.
5280 Belmont Rd	0812407010	Coman & Anderson	Econotemp	Molex Inc
5300 Belmont Rd	0812409005	Magnetrol Intnl Inc	Magnetrol Inc	
5300 Belmont Rd	0812409004	Magnetrol Inc	Magnetrol Inc	
5300 Belmont Rd	0812409006	Magnetrol Intnl Inc	Magnetrol Inc	
801 Burlington Ave	0812214008	Village Of Downers Grove		
801 Burlington Ave	0812302015	Village Of Downers Grove		
5040 Chase Ave	0812417001	Landgrebe, Carl		
5103 Chase Ave	0812401002	Chase-Belmont Properties		Hahn Graphics
2301 Curtiss	0812302018	Arrow Building Corp	Arrow Building Corp.	
2301 Curtiss	0812302019	Spruce Building Llc	Cosi	
2324 Curtiss Ave	0812417003	Rexnord Corporation	Rexnord Corporation	
2400 Curtiss Ave	0812113022	Rexnord Corporation	Rexnord Corporation	
1027 Curtiss St	0812407012	Downers Gr Natl Bk 7982		
2170 Curtiss St	0812113015	Downers Grove San Dist		
2201 Curtiss St	0812404002	Reinert, John E		
2301 Curtiss St	0812407013	Arrow Building Corp	Arrow Building Corp.	
2500 Curtiss St	0812300009	Mlrn 2500 Curtiss St	Dyna Gear	Global Gear
2525 Curtiss St	0812302007	Scot, Incorporated	Scot, Incorporated	
2537 Curtiss St	0812302006	Hi Star Holdings Llc		Ames Supply, Whitelake Building Corp.
2537 Curtiss St	0812302002	Molex Inc	Molex Inc	
2710 Curtiss St	0812113006	Downers Grove San Dist	Downers Grove San Dist	
2710 Curtiss St	0812113010	Downers Grove San Dist	Downers Grove San Dist	
2710 Curtiss St	0812113017	Downers Grove San Dist	Downers Grove San Dist	
2710 Curtiss St	0812112004	Downers Grove San Dist	Downers Grove San Dist	
2710 Curtiss St	0812300008	Downers Grove San Dist	Downers Grove San Dist Offices	
2711 Curtiss St	0812301004	Curtiss Street Ltd Prtnrs		
502 Hitchcock	0811210018	Fromelius, Lawrence D		
414 Hitchcock Ave	0811210012	Ill St Hwy Auth		
414 Hitchcock Ave	0811210013	Lopata, Ned		
2800 Hitchcock Ave	0811210011	2800 Hitchcock Prtn	Molex Inc	
2811 Hitchcock Ave	0811408004	Off The Wall Properties		
2820 Hitchcock Ave	0811210015	Herlin, Gregg R		
2821 Hitchcock Ave	0811408003	Hinsbrook Bk & Tr		
2824 Hitchcock Ave	0811210006	Bales Mold Service	Bales Mold Service	
2830 Hitchcock Ave	0811210005	Bales, Steve		
2831 Hitchcock Ave	0811408012	Hinsbrook Bk & Tr		
5400 Janes Ave	0812304008	Helwig Jr, William F		Tricon Industries, Inc.
5235 Katrine	0812302003	Village Of Downers Grove	Public Well #10	
5200 Katrine Ave	0812301009	Katrine Limited Prtnrs	Lindy	
5200 Katrine Ave	0812301010	Katrine Limited Prtnrs	Lindy	
5235 Katrine Ave	0812302004	La Salle B7800713438		
5300 Katrine Ave	0812301022	Vaughans Seed Co		

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5110 Main St	0812401005	La Salle B7900239830		
5110 Main St (5000-514, 5016-5026 Chase)	0812214001	La Salle B7900239830	Tricon Industries, Inc	
5110 Main St(5001-5011, 5015-5025 Chase)	0812214006	La Salle B7900239830		
2736 Maple Ave	0813100002	Cameo Square Llc	Maple Plaze Cleaners	
2250 S Curtiss St	0812401003	Precision Brand Products	Precision Brand Products	
5101 Thatcher Ave	0811408011	Neuco		
5220 Thatcher Dr	0811407036	Nbd Trust Co Of Illinois		
2820 Thatcher Rd	0811408021	Heuft, Bernhard		
5100 Thatcher Rd	0811407039	American National Bk & Tr		
5120 Thatcher Rd	0811407033	Lehman, John		
5121 Thatcher Rd	0811408020	Hines, C L & B T		
5159 Thatcher Rd	0811408015	Heuft, Bernhard		
5201 Thatcher Rd	0811408019	Arun Enterprises		
5240 Thatcher Rd	0811407037	Crosave Auto Supply		
900 W 61St St (5411 Walnut)	0812305012	Beaton, George		
900 W 61St St (5411 Walnut)	0812305008	Beaton, George		
5413 Walnut	0812305011	Capek, Richard C, Et Al		
5006 Walnut Ave	0811210010	Downers Grove Sanitary		
5007 Walnut Ave	0812112002	Downers Grove Sanitary		
5015 Walnut Ave	0812112003	Downers Grove Sanitary		
5100 Walnut Ave	0811408005	Koszewski, Maria R		
5101 Walnut Ave	0812300001	Panicali, Julie A	Downers Grove Public Works	
5103 Walnut Ave	0812300002	Panicali, Julie A	Downers Grove Public Works	
5104 Walnut Ave	0811408006	Ponstein, William L & R J		
5105 Walnut Ave	0812300003	Panicali, Julie A	Downers Grove Public Works	
5106 Walnut Ave	0811408007	Envirotest Illinois Inc		
5201 Walnut Ave	0812301014	Copia Properties Inc		
5207 Walnut Ave	0812301003	Harris Bk Hinsdale		
5224 Walnut Ave	0811408009	Community Asphalt Paving		
5230 Walnut Ave	0811408022	Mac Neil, David		
5413 Walnut Ave	0812305013	Capek, Richard C, Et Al		
5501 Walnut Ave	0813100001	Glassford, Richard		
5355 Walnut St	0812303002	Vlcek, Michael J		
2222 Wellington Ct (5224 Katrine)	0812301011	Molex Inc	Molex Inc	
2222 Wellington Ct (5225 Walnut)	0812301019	Molex Inc	Molex Inc	
2300 Wisconsin Ave	0812407006	D & B Investment Llc		Jl Clark/Atlas Tube/Mxl
2325 Wisconsin Ave	0812409003	Tricon Industries, Inc.		
2333 Wisconsin Ave	0812409007	Suburban Moving & Storage	Suburban Moving & Storage	Litton/Magnetek/Liberty Copper & Wire
2400 Wisconsin Ave	0812302014	2400 Wisconsin Ave Llc	Burnside Construction	Suburban Self Storage
2424 Wisconsin Ave	0812302013	Wisconsin Ave Property	Flowserv	Bison Gear & Engineering Corp
2435 Wisconsin Ave	0812304006	Mac Neil R E Holdings Llc		
2451 Wisconsin Ave	0812304005	Schuenthaler, Edward P		

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Preliminary Planning Report
Ellsworth Industrial Park
Downers Grove, Illinois

PROPERTY ADDRESS	PIN	CURRENT OWNER NAME	CURRENT TENANTS OR OCCUPANTS	PREVIOUS OWNER(S), TENANTS, OR OCCUPANTS
2464 Wisconsin Ave	0812302012	Park Investors Venture I		Seatt/Silk Screener
2514-2518 Wisconsin Ave	0812302011	Park Investors Venture I	Cvp Systems	
2525 Wisconsin Ave	0812304004	Flexible Steel Lacing	Flexible Steel Lacing Co. (Flexco)	
2525 Wisconsin Ave	0812304002	Flexible Steel Lacing Co	Flexible Steel Lacing Co. (Flexco)	
2525 Wisconsin Ave	0812304003	Flexible Steel Lacing Co	Flexible Steel Lacing Co. (Flexco)	
2538 Wisconsin Ave	0812302010	Illinois Tool Works Inc	Norwood	
2550 Wisconsin Ave	0812302016	Midwest Bk & Tr		
2655 Wisconsin Ave	0812304001	A A O Real Estate Llc	Lovejoy, Inc	
2659 Wisconsin Ave	0812303008	Johnson, Ross A & B R	Hahn Graphics	Morey Corp.
2701 Wisconsin Ave	0812303004	Cynowa, Robert A		
2701 Wisconsin Ave	0812303006	Cynowa, Robert A		
2732 Wisconsin Ave	0812301007	Spannagel Tool & Die Co	Spannagel Tool & Die Co	
2748 Wisconsin Ave	0812301006	Khatau Holdings Llc		
2700 Wisconson Ave	0812301021	Weigand, George &Margaret		
Cnb D G Tr 2620 (5126 Walnut)	0811408008	Joe Madden Tr 2620	Auto Nation	
D G Walnut Bldg Acct	0812303003	D G Walnut Bldg		
Downers Grove National Bk	0812302001	Downers Grove National Bk	Fusibond	
Downers Grove San	0811207011	Downers Grove San	Downers Grove San Dist	
Downers Grove San	0811207012	Downers Grove San	Downers Grove San Dist	
Downers Grove San	0811208007	Downers Grove San	Downers Grove San Dist	
Downers Grove San	0812113020	Downers Grove San	Downers Grove San Dist	
Downers Grove San Dist	0811207014	Downers Grove San Dist	Downers Grove San Dist	
Downers Grove San Dist	0811207015	Downers Grove San Dist	Downers Grove San Dist	
Downers Grove San Dist	0811210016	Downers Grove San Dist	Downers Grove San Dist	
Elwood Industrial Dev Co	0812404001	Elwood Industrial Dev Co		
Illinois St Toll Hwy Auth	0811210017	Illinois St Toll Hwy Auth		
La Grange State Bk 467	0812304007	Sw Anderson Co		
Little Friends Inc	0812407005	Little Friends Inc		
Schumacher, George J	0812300007	Blondin, Daniel P	Downers Grove Public Works	
Thatcher Rd	0811407042	Arun Enterprises		

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Shaded denotes previously sampled by IEPA, U.S.EPA within property boundary

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FIGURES

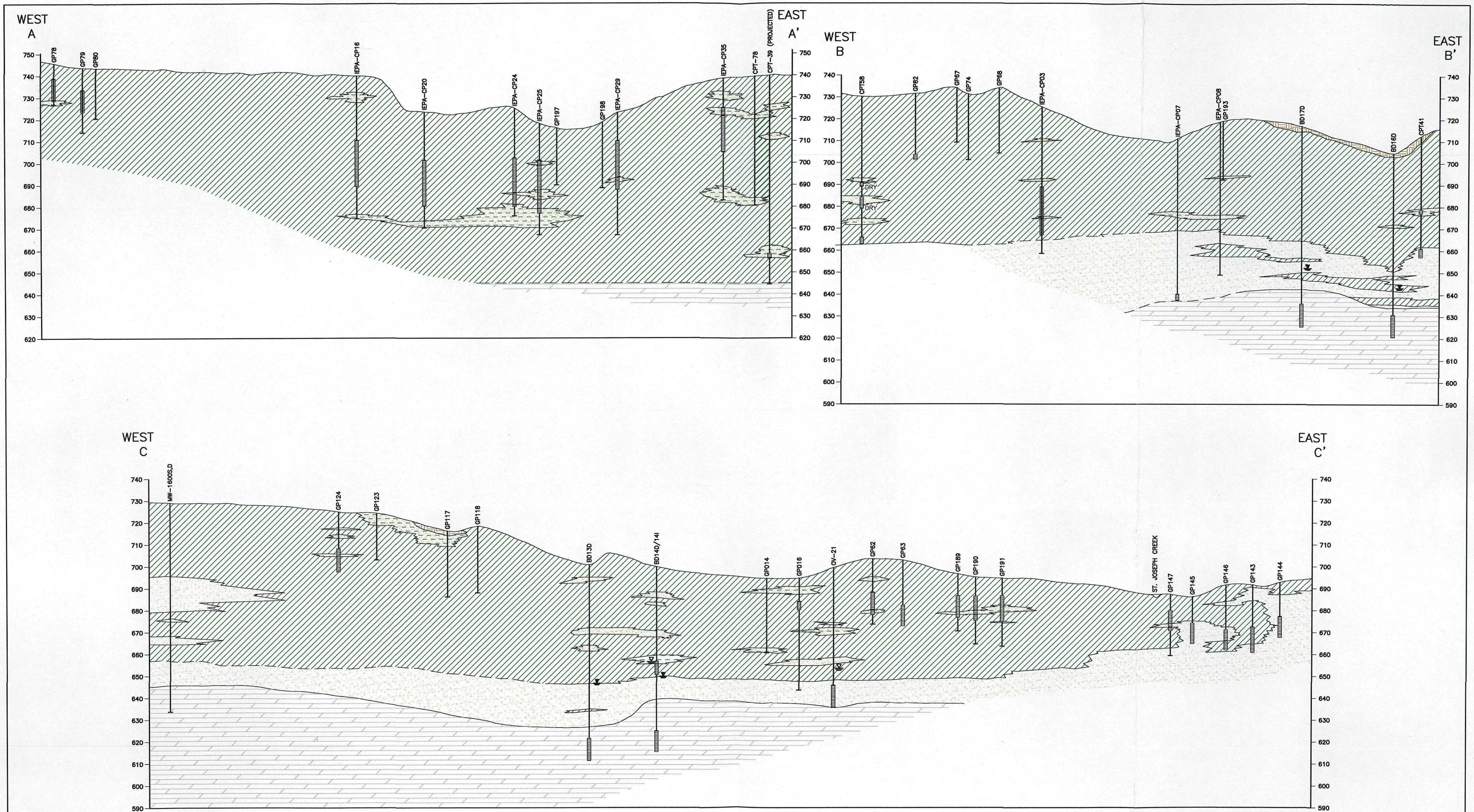
The following disclaimer is added to figures 2-2, 2-9 through 2-12, 2-16, 2-17 through 2-24, 2-26, and 2-33 through 2-36 of the final version of the Ellsworth Industrial Park Preliminary Planning Report:

> "The contours on this figure reflect only an estimate based on conservative interpolation of sometimes limited data. They are intended only for planning purposes and may overstate the extent of the contamination that will ultimately be identified in the RI. They are not intended as, and should not be relied on as, final or definitive delineations."

In addition, the locations of monitoring wells BD-09, BD-10, and BD-11 are added to the figures where appropriate.

The revised figures will be provided when a complete version of the entire final PPR is generated in the near future.

As stated in the cover letter, the addresses listed on the figures were obtained from DuPage County records. The address information contained on the figures may be incomplete or out of date, and are not intended to signify ownership of parcels or association between parcels currently listed with the same address.



LEGEND

- FILL
- SILTY CLAY/CLAYEY SILT
- SILTY SAND/SANDY SILT
- SILT
- SAND/GRAVEL
- BEDROCK (DOLOMITE)
- OVERBURDEN WELL WATER LEVEL
- BEDROCK WELL WATER LEVEL
- MONITORING WELL SCREENED INTERVAL OR WATER SAMPLE INTERVAL

NOTE:
WATER LEVELS BASED ON JULY 2004 DATA.

RESPONSE ACTION CONTRACT

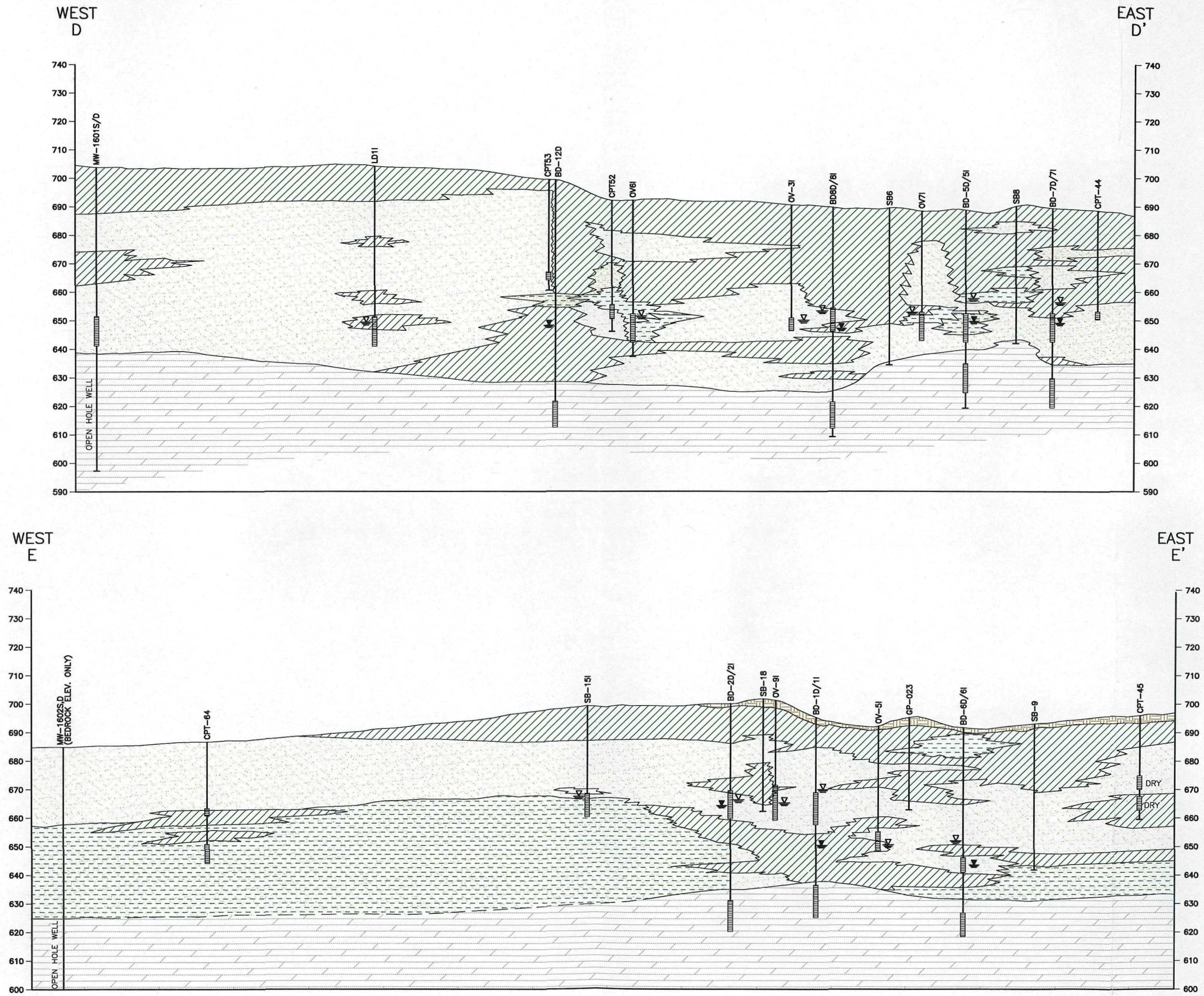
U.S. EPA CONTRACT No. 68-W7-0026
WORK ASSIGNMENT No. 233-RICO-B52A
DOCUMENT CONTROL No. 233-2A-AVBQ

CROSS SECTIONS A-A', B-B' AND C-C'

ELLSWORTH INDUSTRIAL PARK

Downers Grove, Illinois

SCALE:	DRAWN:	DATE:	DWG. NO.	
AS NOTED	D.C.H.	11/05	17802	FIGURE 2-4



LEGEND

- FILL
- SILTY CLAY/CLAYEY SILT
- SILTY SAND/SANDY SILT
- SILT
- SAND/GRAVEL
- BEDROCK (DOLOMITE)
- OVERBURDEN WELL WATER LEVEL
- BEDROCK WELL WATER LEVEL
- MONITORING WELL SCREENED INTERVAL OR WATER SAMPLE INTERVAL

NOTE:
WATER LEVELS BASED ON JULY 2004 DATA.

VERTICAL 20' — HORIZONTAL 250' (0')

RESPONSE ACTION CONTRACT

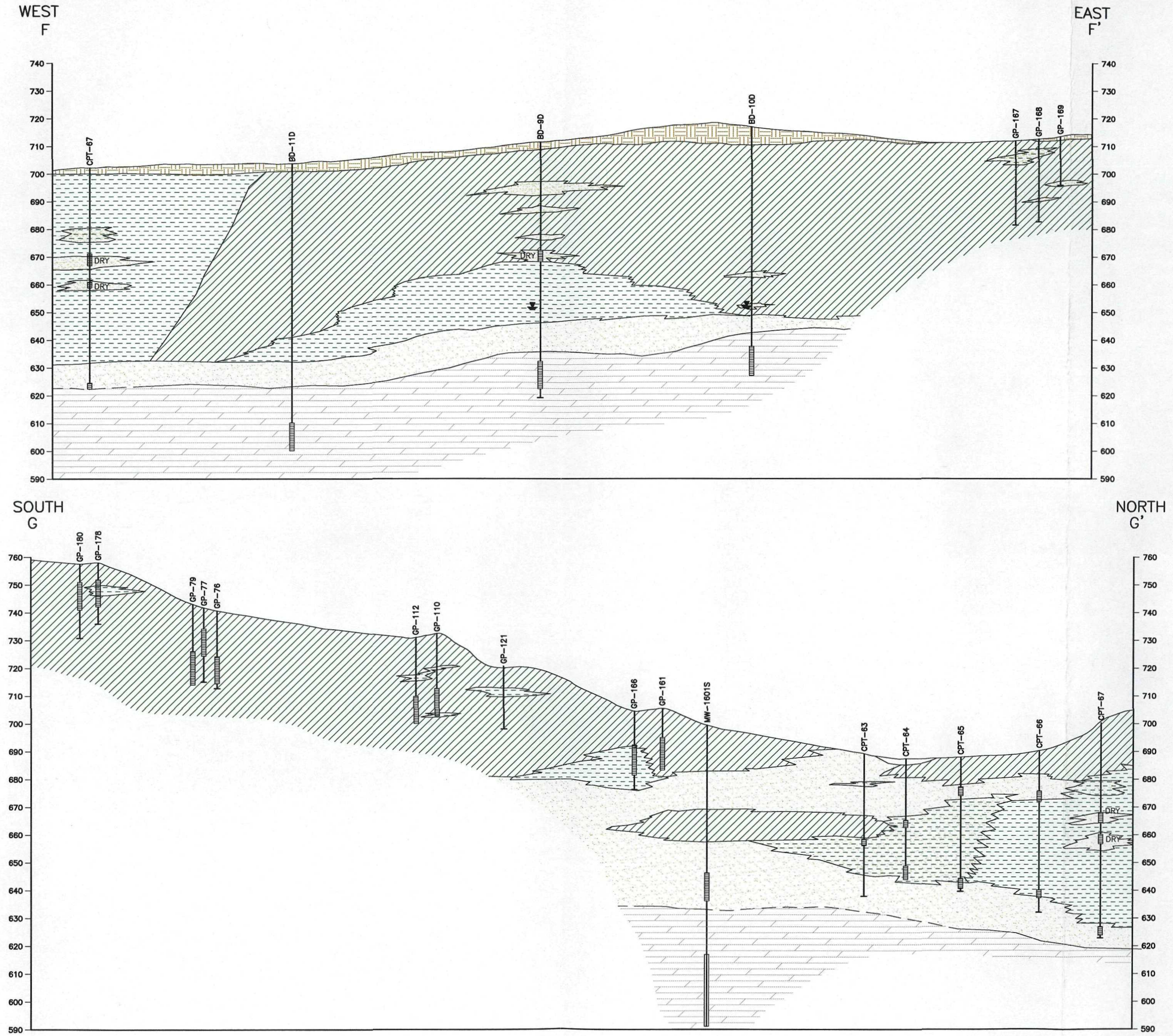
U.S. EPA CONTRACT No. 68-W7-0026
WORK ASSIGNMENT No. 233-RICO-B52A
DOCUMENT CONTROL No. 233-2A-AVBQ

CROSS SECTIONS D-D' AND E-E'

ELLSWORTH INDUSTRIAL PARK

Downers Grove, Illinois

SCALE:	DRAWN:	DATE:	DWG. NO.	
AS NOTED	D.C.H.	11/05	17802	FIGURE 2-5



LEGEND

- FILL
- SILTY CLAY/ CLAYEY SILT
- SILTY SAND/ SANDY SILT
- SILT
- SAND/GRAVEL
- BEDROCK (DOLOMITE)
- OVERBURDEN WELL WATER LEVEL
- BEDROCK WELL WATER LEVEL
- MONITORING WELL SCREENED INTERVAL OR WATER SAMPLE INTERVAL

NOTE:
WATER LEVELS BASED ON JULY 2004 DATA.

VERTICAL 0' 20'
HORIZONTAL 0' 250'

RESPONSE ACTION CONTRACT

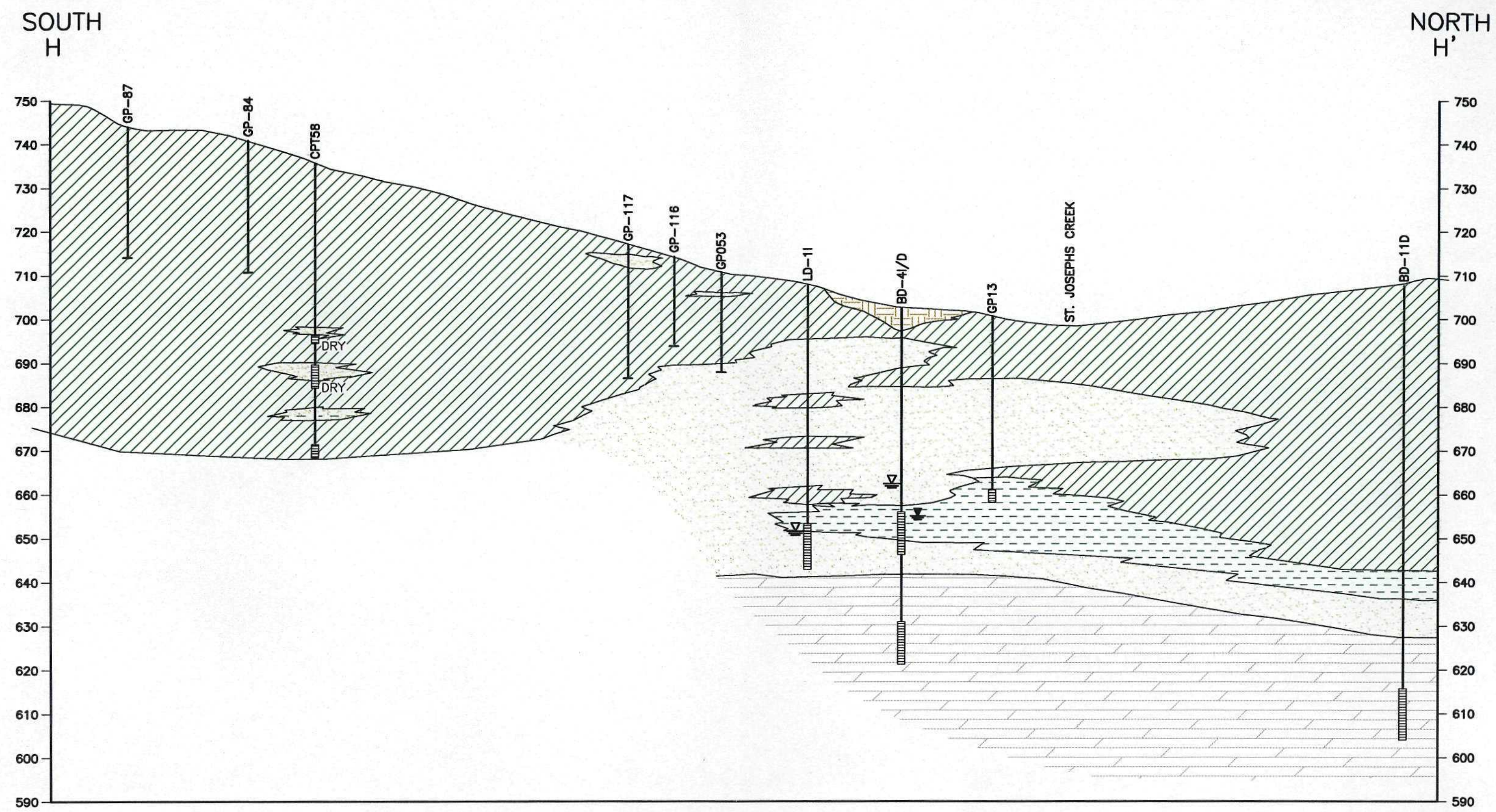
U.S. EPA CONTRACT No. 68–W7–0026
WORK ASSIGNMENT No. 233–RICO–B52A
DOCUMENT CONTROL No. 233–2A–AVBQ

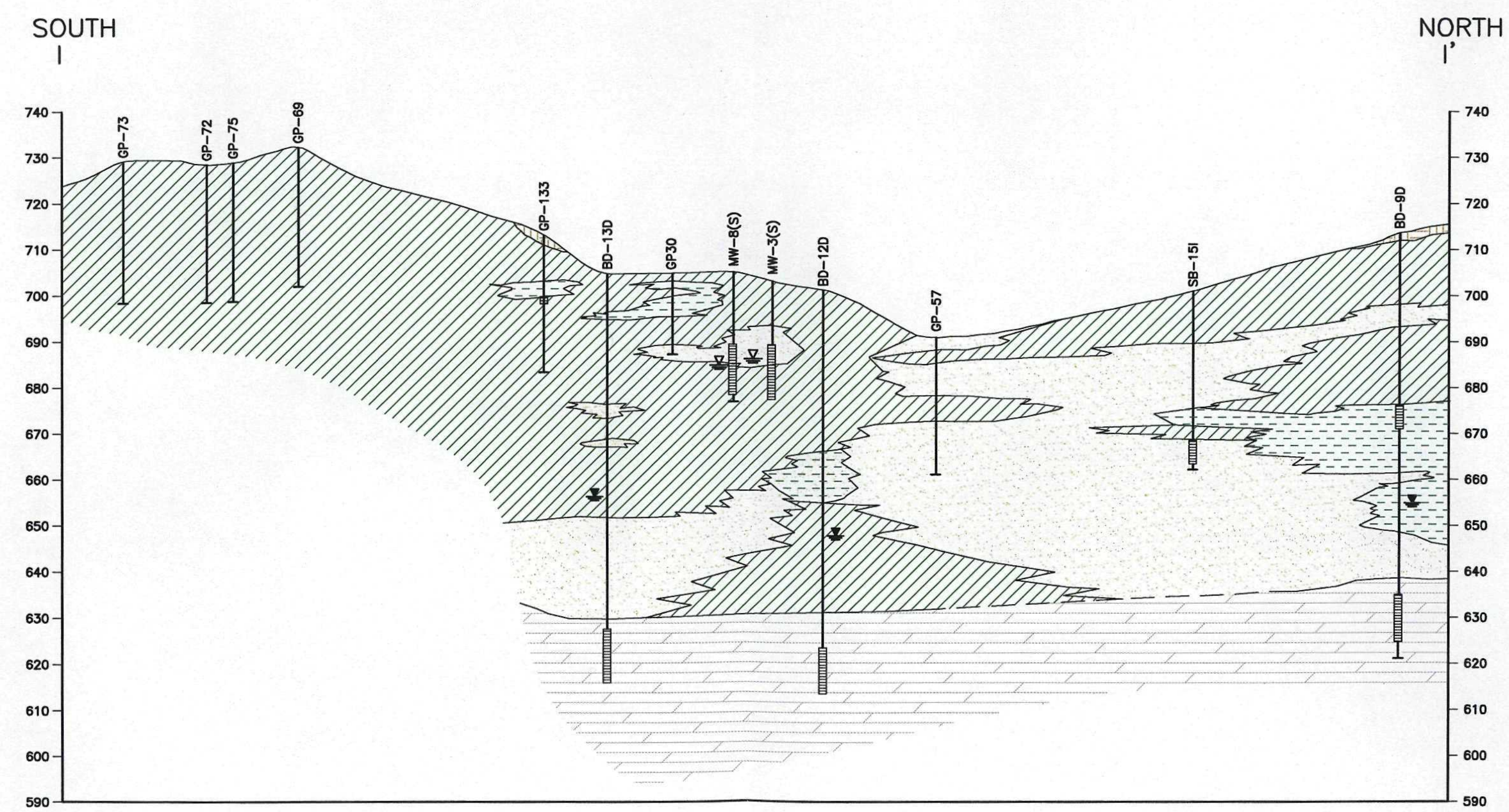
CROSS SECTIONS F–F' AND G–G'

ELLSWORTH INDUSTRIAL PARK

Downers Grove, Illinois

SCALE:	DRAWN:	DATE:	DWG. NO.	
AS NOTED	D.C.H.	11/05	17802	FIGURE 2–6

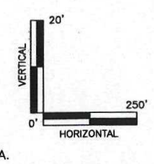




LEGEND

- FILL
- SILTY CLAY/CLAYEY SILT
- SILTY SAND/SANDY SILT
- SILT
- SAND/GRAVEL
- BEDROCK (DOLOMITE)
- OVERBURDEN WELL WATER LEVEL
- BEDROCK WELL WATER LEVEL
- MONITORING WELL SCREENED INTERVAL OR WATER SAMPLE INTERVAL

NOTE:
WATER LEVELS BASED ON JULY 2004 DATA.

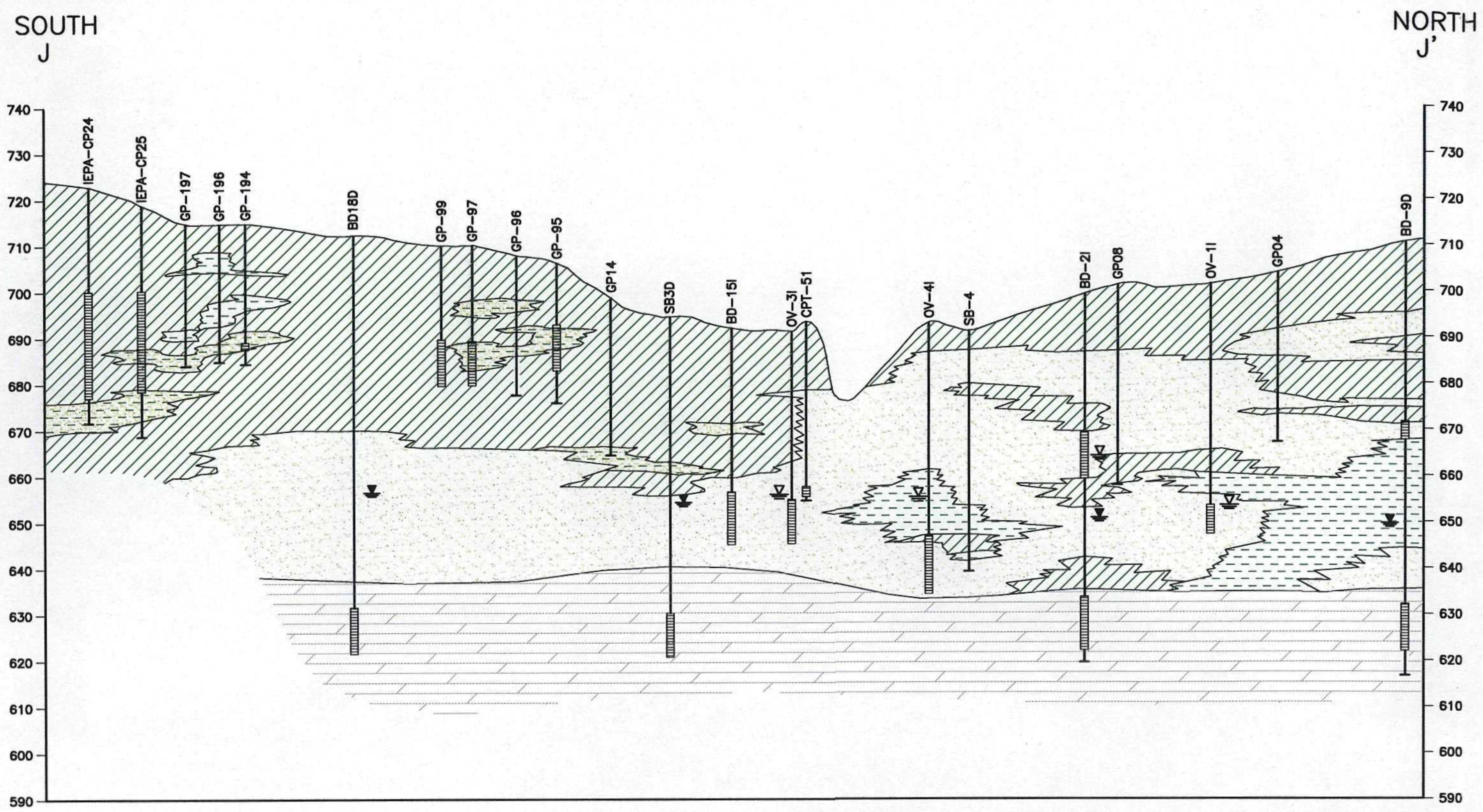


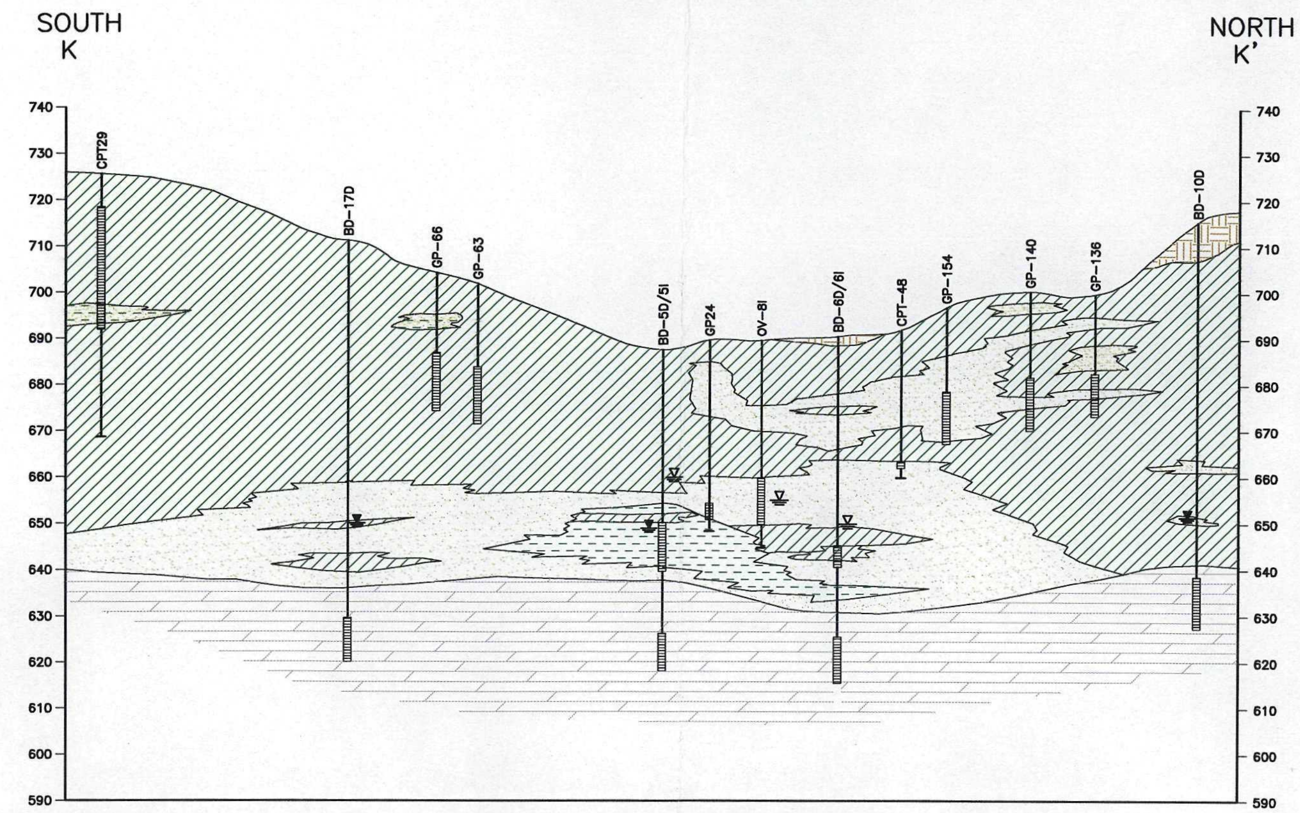
RESPONSE ACTION CONTRACT

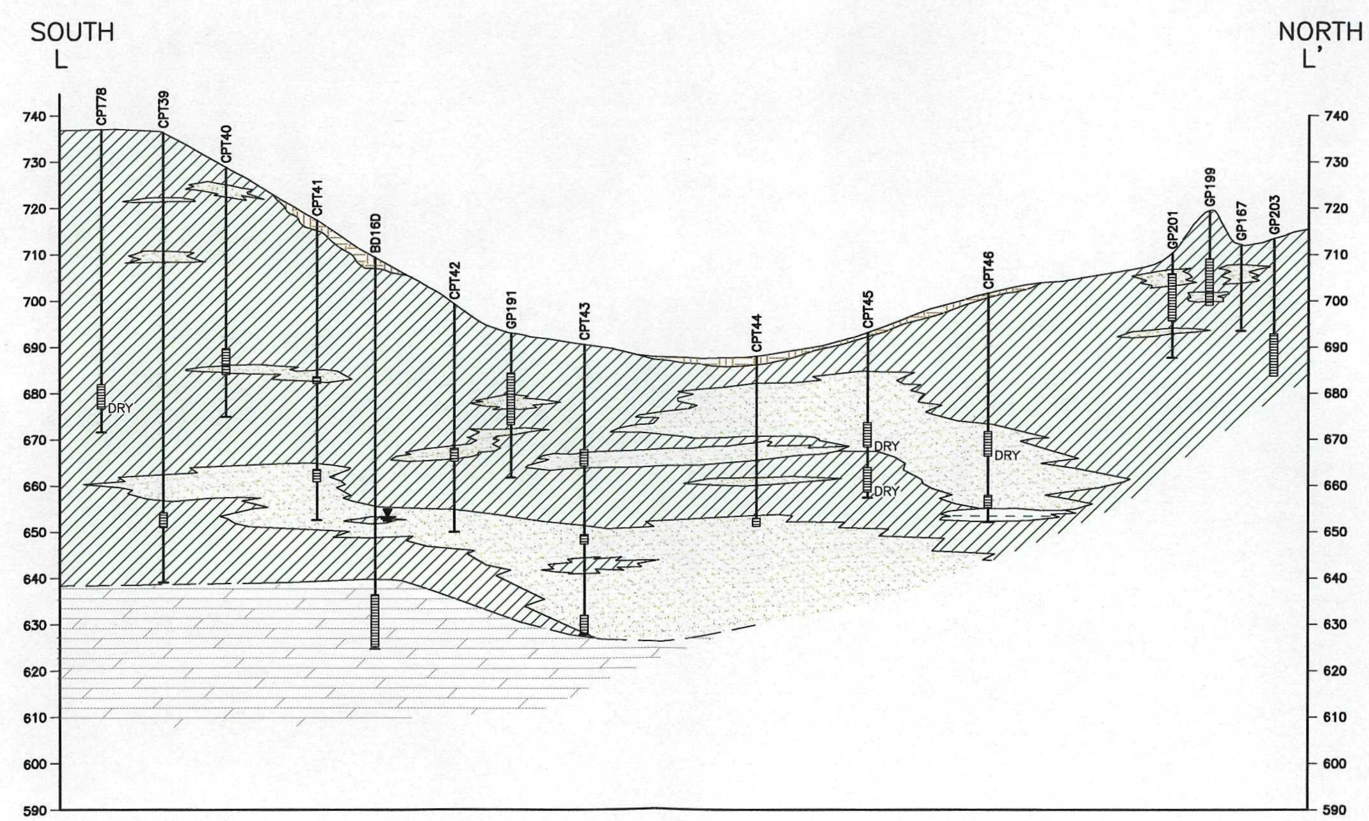
U.S. EPA CONTRACT No. 68-W7-0026
WORK ASSIGNMENT No. 233-RICO-B52A
DOCUMENT CONTROL No. 233-2A-AVBQ

CROSS SECTIONS H-H' AND I-I'
ELLSWORTH INDUSTRIAL PARK
Downers Grove, Illinois

SCALE:	DRAWN:	DATE:	DWG. NO.	
AS NOTED	D.C.H.	11/05	17802	FIGURE 2-7







LEGEND

- FILL
- SILTY CLAY/CLAYEY SILT
- SILTY SAND/SANDY SILT
- SILT
- SAND/GRAVEL
- BEDROCK (DOLOMITE)
- OVERBURDEN WELL WATER LEVEL
- BEDROCK WELL WATER LEVEL
- MONITORING WELL SCREENED INTERVAL OR WATER SAMPLE INTERVAL

NOTE:
WATER LEVELS BASED ON JULY 2004 DATA.

VERTICAL 20'
0' 250'
HORIZONTAL

RESPONSE ACTION CONTRACT

U.S. EPA CONTRACT No. 68-W7-0026
WORK ASSIGNMENT No. 233-RICO-B52A
DOCUMENT CONTROL No. 233-2A-AVBQ

CROSS SECTIONS J-J', K-K' AND L-L'

ELLSWORTH INDUSTRIAL PARK
Downers Grove, Illinois

SCALE:	DRAWN:	DATE:	DWG. NO.	
AS NOTED	D.C.H.	11/05	17802	FIGURE 2-8

DMS US EPA Region V

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APPENDIX C

RI/FS SCOPE OF WORK

SECTION 1

INTRODUCTION

This appendix to the Preliminary Planning Report (PPR) was prepared to summarize the proposed investigative scope-of-work (SOW) for the upcoming Remedial Investigation/Feasibility Study (RI/FS) at OU1 of the Ellsworth Industrial Park Site. This appendix will detail the planning activities associated with the RI/FS, explain the rationale behind the proposed investigative activities, describe the proposed investigative activities which will utilize the Triad Approach, detail the reporting related to the RI/FS process, and summarize the estimated costs of the overall RI/FS.

SECTION 2

PLANNING ACTIVITIES

Prior to undertaking the RI/FS, a number of planning activities must occur that will ensure the success of the investigation, and ensure that data obtained from the investigation is of sufficient quality to be useful in further analysis of the site. The planning activities are described in more detail in the following subsections.

2.1 SITE MANAGEMENT PLAN

A Site Management Plan (SMP) will be prepared for the RI/FS process, and will provide a written understanding of how site access, site security, management responsibilities, contingency procedures, and waste disposal will be handled. In addition, a Pollution Control and Mitigation Plan (PCMP) and a Transportation and Disposal Plan (T&D Plan) will be included as attachments to the SMP. The PCMP will detail the process, procedures, and safeguards that will be used to ensure contaminants are not released during implementation of the RI. The T&D Plan will outline how wastes encountered or generated during the RI will be managed and disposed of, including how wastes will be transported off-site for treatment and/or disposal.

2.2 HEALTH AND SAFETY PLAN

A site-specific Health and Safety Plan (HASP) will be prepared that complies with the applicable Occupational Safety and Health Administration (OSHA) regulations detailed in 29 CFR Part 1910. The HASP will specify employee training, protective equipment, medical surveillance requirements, standard operating procedures, and a contingency plan in accordance with 40 Code of Federal Regulations (CFR) 300.150 of the National Contingency Plan (NCP) and 29 CFR 1910.120 1(1). The HASP will also address health and safety requirements for site visitors.

2.3 SAMPLING AND ANALYSIS PLAN

A site-specific Sampling and Analysis Plan (SAP) will also be prepared prior to implementation of the RI. The SAP will define the sampling and data collection methods that will be used for the RI/FS activities and includes sampling objectives; sampling locations and frequency; and sample handling and analysis. The SAP will be developed in accordance with U.S. EPA Environmental and Compliance Branch Standard Operating Procedures (SOPs) and the Quality Assurance Manual (latest revision). The SAP will incorporate aspects of the Triad Approach, and will ensure that all data gathering activities are performed in accordance with established QA objectives.

The SAP will include three separate components, the Quality Assurance Project Plan (QAPP), the Field Sampling Plan (FSP), and the Data Management Plan.

2.3.1 Quality Assurance Project Plan (QAPP)

A site-specific QAPP will be prepared prior to implementation of the RI, and will include sample analysis and data handling for the samples collected and data generated during the RI. The QAPP will be prepared in accordance with the *Region 5 Instructions on the Preparation of a Superfund Division Quality Assurance Project Plan Based on EPA QA/R-5* (Revision 0, June 2000); *EPA Requirements for Quality Assurance Project Plans (QA/R-5)* (EPA/240/B-01/003, March 2001); and *EPA Guidance for Quality Assurance Project Plans (QA/G-5)* (EPA/600/R-98/018, February 1998). The QAPP will describe the project objectives and organization, functional activities, and quality assurance and quality control (QA/QC) protocols that will be used to achieve the desired data quality objectives (DQOs). The DQOs will reflect use of analytical methods to identify contamination and remediate contamination consistent with the levels for remedial action objectives identified in the National Contingency Plan, 40 CFR Part 300. In addition, the QAPP will address sampling procedures, sample custody, analytical procedures, and data reduction, validation, reporting and personnel qualifications. Analytical tracking information consistent with U.S. EPA's Office of Solid Waste and Emergency Response (OSWER) Directive No. 9240.0-2B *Extending the Tracking of Analytical Services to PRP-Lead Superfund Sites* will also be incorporated into the QAPP, where applicable.

The QAPP will also document that each laboratory that will be used during the RI is qualified to conduct the proposed work. This includes the use of methods and analytical protocols for the chemicals of concern in the media of interest within detection and quantification limits consistent with both QA/QC procedures and the DQOs. The QAPP will include documentation showing that the laboratory(s) have and follow approved QA programs. In addition, the QAPP will include documentation that all laboratories have been accredited under the National Environmental Laboratory Accreditation Program (NELAP).

2.3.2 Field Sampling Plan (FSP)

The FSP will define in detail the sampling and data-gathering methods that will be used to collect the data during implementation of the RI. The FSP will discuss how the specific tasks outlined in the FSP meet the site-specific objectives of the RI/FS, the detailed objectives of each investigation, and the DQOs.

For each portion of the overall investigation, the FSP will present a statement of the problems and the potential problems anticipated at the site; discuss previous sampling locations, analytical results and other relevant information; discuss the detailed objectives of each portion of the overall investigation, including the DQOs; and discuss and explain in detail how the specific work and activities will be performed as part of each investigation will meet the objectives of the overall investigation; and be used in the RI Report, the human health and ecological risk assessments, and the FS.

For each portion of the investigation, the FSP will include a detailed description of the sampling objectives; sample locations, depths and frequency; sampling equipment and procedures; field measurements, analyses and procedures; sample preservation and handling; the field notes that will be collected; field quality assurance procedures; planned analyses; standard operating procedures; and decontamination procedures. The FSP will include step-by-step instructions and be written so that a field sampling team unfamiliar with the Ellsworth Industrial Park Site would be able to gather the samples and the required field information according to the approved protocols. The FSP will explain and justify why specific equipment and sampling procedures were selected and how they are appropriate for the work being performed and the objectives of this investigation. In addition, the FSP will outline the QA procedures, such as a demonstration of method applicability, to ensure that field screening instruments were selected properly and are optimal for the site conditions. The FSP will also include figures that illustrate all previous sampling locations with notes for any significant findings including groundwater elevation contours and the planned RI sample locations on the same map. In addition, the FSP will include a schedule which identifies the timing for the initiation and completion of all tasks completed as a part of the FSP.

2.3.3 Data Management Plan

The Data Management Plan will specify the procedures for storing, handling, accessing, and securing data collected during the RI. The Data Management Plan will be prepared with significant input from the U.S. EPA FIELDS group. Specific elements included within the Data Management Plan include the following:

1. Real-time information processing and analysis
2. Electronic Data Deliverables (EDDs)

3. Site database updates

4. Information distribution and sharing using a project-specific website (e.g., Weston's TeamLink), or File Transfer Protocol (FTP) site

5. Use of U.S. EPA FIELDS Rapid Assessment Tools (RAT)

6. Utilization of U.S. EPA FIELDS Mobile GIS Laboratory

SECTION 3

INVESTIGATION ACTIVITIES

3.1 MOBILIZATION/SUBCONTRACTOR PROCUREMENT

After approval of all planning documents for the RI, the subcontractors necessary to perform the activities described in the following subsections shall be procured. After procurement, all equipment, personnel, supplies, vendors, and subcontractors will mobilize to the site in order to perform the investigation. Mobilization activities will include notifying the State of Illinois one-call underground utility notification network (JULIE), obtaining any required temporary utility connections, and coordinating with state and local authorities regarding the upcoming activities. In addition, access agreements will need to be obtained for all properties that will be investigated during the RI.

3.2 UTILITY CORRIDOR SURVEY

As stated in Subsection 4.4.2 of the PPR, a utility corridor evaluation targeting features such as sump, sand, and grease traps will be performed initially to evaluate potential sources and releases that may not have been identified during previous investigations. This investigation will be conducted in two stages: data gathering and compilation, and vapor sampling.

As described in Subsection 4.4.2, the data gathering and compilation will be accomplished by first reviewing available records, such as DuPage County underground utility (water, sanitary sewer, storm sewer) maps, individual facility records and maps, and private utility records (ComEd, Peoples Gas/Nicor, telecommunications providers, etc.). The DuPage County underground utility maps are in the process of being converted into electronic files, but are only currently available as paper copies. In order to maximize the effectiveness of the underground utility locations, the paper copies will be digitized and imported as layers onto the existing Ellsworth Industrial Park figures. The main focus of this investigation will be the storm and sanitary sewers within the Ellsworth Industrial Park, specifically the portions of the utility lines extending from the facility buildings to the main lines. If the review of the available records does not yield sufficient information, then an inspection will be undertaken. The inspection may consist of some combination of the following: visual survey, dye testing, inspection camera survey, and inspection radio tracking survey. It is expected during this phase that individual PRP property owners will identify, locate, and mark all utility corridors within their respective private properties prior to field mobilization.

The second stage of the utility corridor survey will involve vapor sampling within the underground utility corridors. Vapor samples will be collected from easily accessible locations, such as catch basins, sumps, traps, manholes, and outfalls. The vapor sampling will be conducted using a real-time vapor sampling wand that samples vapors that are analyzed by a HAPSITE mobile GC/MS. Further information regarding the HAPSITE GC/MS is detailed in Subsection 4.4.2 of the PPR. It is estimated that the mobile HAPSITE GC/MS will be required at the Site for approximately 7 days.

3.3 SUB-SLAB MONITORING

Following the utility corridor survey, building sub-slab monitoring will be conducted. The buildings where the sub-slab passive soil gas samples will be collected are illustrated on Figure C-1 through C-12, and the number of samples anticipated per study area is summarized in Table C-1. The placement of the sub-slab samples illustrated on Figure C-1 through C-12 were intended only to provide a visual illustration of the number of samples proposed in each of the areas, and were not meant to necessarily illustrate the proposed sampling locations. The actual locations of the sub-slab samples will be determined based on visual observations and historical information. In addition, the number of sub-slab passive soil gas samples may be refined based on the results of the utility corridor survey and information gathering activities.

The passive soil gas samples will be collected using the methodology described in the Passive Soil Gas Survey subsection below. A concrete coring subcontractor will first core through the building slabs in areas determined by the Field Team Leader during an initial site inspection, and the locations will be based on visual observations and historical information. Following the concrete coring activities, the passive soil gas samples will be collected using the technology and methodology listed in the following subsection. Passive soil gas samples may be collected from variable depths from the granular backfill (which is more porous than native material) located under building slabs or foundations.

3.4 PASSIVE SOIL GAS SURVEY

As stated in Subsection 4.4.3 of the PPR, a passive soil gas survey will be undertaken during the RI/FS in order to characterize potential sources, delineate chlorinated solvent contamination within the soil, and to select where additional soil borings and sampling should occur. As stated in Subsection 4.4.3, the depth of the passive soil gas sampling locations will be variable, as will the locations, depending on the results of the utility corridor survey and sub-slab sampling. Exact placement locations and depths will be specified based on the evolving CSM. For purposes of this Scope of Work, the estimated placement of passive soil gas sampling locations is illustrated for each of the Study Areas in Figures C-1 through C-13. A summary of the number of anticipated passive soil gas samples collected in each study area is included in Table C-1. However, the number and placement locations of the passive soil gas samplers will be determined based on the evolving CSM.

Placement depths of the samplers will be determined following completion of the utility corridor survey and sub-slab sampling. However, it is assumed that the majority of the passive soil gas samples will be collected from a depth of approximately 3 ft bgs, and the remainder of the passive soil gas samples will be collected from deeper depths in areas where the utility corridor survey has indicated a potential source or preferential pathway at a deeper depth, at which depth the passive soil gas will be collected. In addition, some passive soil gas samples may be collected from the granular backfill surrounding building perimeters or from the granular backfill that was installed around underground utilities identified in the utility corridor survey. Preliminary locations of the passive soil gas samples were determined by placing a 50 or 100-foot grid over each area of interest, and selecting the nodes within the area boundaries that were located outside of the building footprints. In addition, nodes were not selected when located within streets or St. Joseph's Creek. Some study areas had fluctuations in the number of passive soil gas samples proposed based on existing information.

The installation of passive soil gas samplers (in locations without concrete or asphalt surfacing) is accomplished by advancing a 1-inch diameter hole to a depth of 3 feet using a hammer drill. If it is determined to be necessary, direct push technology equipment can be used to advance a hole to a depth greater than 3 feet bgs. It is anticipated that the direct push rig use will be minimal, and that the majority of samples will be collected from depths where manual installation is possible. In either case, the passive soil gas sampler (which contains two pairs of hydrophobic adsorbent cartridges selected to effectively target a broad range of compounds) can be installed in the upper portion of the hole. For locations covered by asphalt or concrete surfacing, an approximate 1 to 2-inch diameter hole is drilled or cored through the surfacing material to the underlying substrate. The hammer drill or the direct push equipment is then used to advance through the substrate to the underlying soil to the proper sampling depth. Following the creation of the sampling hole, it is fitted with a sanitized metal pipe sleeve. After the sampler is installed inside the pipe, the hole is patched with an aluminum foil plug and a thin concrete patch to protect the sampler. Corks will not be used to plug the holes, because they can allow contamination to enter into the hole during the exposure period, resulting in false positives.

The samplers will generally be exposed to subsurface gas for three days. The duration of the exposure period will be determined based on the soil type where the passive soil gas sampler is placed. Following the exposure period, the samplers will be retrieved and shipped to an off-site laboratory for analysis. A trip blank, which will remain with the passive soil gas samples during preparation, shipment, and storage, will be included with each batch of up to 40 field samples.

3.5 SOIL SAMPLING

As stated in Subsection 4.4.5 of the PPR, a soil boring investigation will be undertaken during the RI/FS in order to characterize potential sources, delineate chlorinated solvent contamination within the soil, characterize the subsurface geology, and to select where additional soil borings and monitoring wells should be advanced. Soil borings will be advanced using a combination of direct-push technology and EP-sonic drilling techniques. Soil borings are expected to be advanced in general to 20 to 40 feet bgs, with the termination depth to be based on field observations and the results of real-time mobile laboratory analysis. Approximately 20% of the soil borings may be advanced to bedrock using EP-sonic drilling to evaluate deeper lithology and chemical conditions at the bedrock surface (e.g., high concentration zones or DNAPL). Soil borings will be continuously logged by a qualified Geologist using the United Soil Classification System (USCS) to document and describe the subsurface geology. DSITMS will be used to analyzed headspace for the intervals of interest, as specified in Subsection 4.4.5 of the PPR. In addition to the on-site DSITMS analysis, soil samples will be collected and sent to an off-site laboratory for analysis as confirmation and/or QA/QC samples to ensure correlation with DSITMS results.

In addition to the soil sampling used for the purposes of chemical characterization, some soil samples will be collected and analyzed to determine some of the important physical parameters associated with the geologic materials at the site. Physical parameters, such as total organic carbon, cation exchange capacity, and oxidation reduction potential, grain size, and in-situ hydraulic conductivity (generally only collected from low-permeability materials such as clay). Physical soil parameters will be collected from locations determined during the field investigation, based on where each of the soil types are discovered. It is assumed that 30 physical soil samples will be collected from the permeable material and 30 soil samples will be collected from the low permeability material (clay). Samples from the low permeability material will be collected using Shelby tubes.

The following sections examine the soil sampling activities proposed in each of the study areas individually. A subsection below is included for areas where sampling will occur that is not within any of the study areas. Also, approximately 10% of all soil samples analyzed using DSITMS will also be submitted to an off-site laboratory for analysis as a QA/QC measure.

3.5.1 Study Area A

A total of 21 soil borings are proposed for Study Area A, however, 10 of them are not illustrated on Figure C-1, because the locations will be determined based on the results of the utility corridor survey, sub-slab sampling, soil gas sampling, and analytical results presented in the PPR. For costing purposes, it is assumed that a total of 21 soil borings will be advanced to depths ranging from 20 to 40 ft bgs. If the existing analytical data, utility corridor survey, sub-slab sampling, and the soil gas sampling do not discover any chlorinated solvent contamination within this study area, the number of soil borings advanced may be decreased, potentially excluding some of the 21 soil borings proposed for Study Area A. The number of soil borings, the placement of these borings, and the soil sampling depths will be determined based on the evolving CSM, and the quantities and/or locations indicated above and in Table C-1 and Figure C-1 are preliminary.

3.5.2 Study Area B

A total of 24 soil borings are proposed for Study Area B, however, 15 of them are not illustrated on Figure C-2, because the locations will be determined based on the results of the utility corridor survey, sub-slab sampling, soil gas sampling, and analytical results presented in the PPR. For costing purposes, it is assumed that a total of 19 soil borings will be advanced to depths ranging from 20 to 40 ft bgs. If the existing analytical data, utility corridor survey, sub-slab sampling, and the soil gas sampling do not discover any chlorinated solvent contamination within this study area, the number of soil borings advanced may be decreased, potentially excluding some of the 24 soil borings proposed for Study Area B. The number of soil borings, the placement of these borings, and the soil sampling depths will be determined based on the evolving CSM, and the quantities and/or locations indicated above and in Table C-1 and Figure C-2 are preliminary.

3.5.3 Study Area C

A total of 55 soil borings are proposed for Study Area C, however, 10 of them are not illustrated on Figure C-3, because the locations will be determined based on the results of the utility corridor survey, sub-slab sampling, soil gas sampling, and analytical results presented in the PPR. For costing purposes, it is assumed that a total of 55 soil borings will be advanced to depths ranging from 20 to 40 ft bgs. If the existing analytical data, utility corridor survey, sub-slab sampling, and the soil gas sampling do not discover any chlorinated solvent contamination within this study area, the number of soil borings advanced may be decreased, potentially excluding some of the 55 soil borings proposed for Study Area C. The number of soil borings, the placement of these borings, and the soil sampling depths will be determined based on the evolving CSM, and the quantities and/or locations indicated above and in Table C-1 and Figure C-3 are preliminary.

3.5.4 Study Area D

A total of 27 soil borings are proposed for Study Area D, however, 10 of them are not illustrated on Figure C-4, because the locations will be determined based on the results of the utility corridor survey, sub-slab sampling, soil gas sampling, and analytical results presented in the PPR. For costing purposes, it is assumed that a total of 27 soil borings will be advanced to depths ranging from 20 to 40 ft bgs. If the existing analytical data, utility corridor survey, sub-slab sampling, and the soil gas sampling do not discover any chlorinated solvent contamination within this study area, the number of soil borings advanced may be decreased, potentially excluding some of the 27 soil borings proposed for Study Area D. The number of soil borings, the placement of these borings, and the soil sampling depths will be determined based on the evolving CSM, and the quantities and/or locations indicated above and in Table C-1 and Figure C-4 are preliminary.

3.5.5 Study Area E

A total of 18 soil borings are proposed for Study Area E, however, 10 of them are not illustrated on

Figure C-5, because the locations will be determined based on the results of the utility corridor survey, sub-slab sampling, soil gas sampling, and analytical results presented in the PPR. For costing purposes, it is assumed that a total of 18 soil borings will be advanced to depths ranging from 20 to 40 ft bgs. If the existing analytical data, utility corridor survey, sub-slab sampling, and the soil gas sampling do not discover any chlorinated solvent contamination within this study area, the number of soil borings advanced may be decreased, potentially excluding some of the 18 soil borings proposed for Study Area E. The number of soil borings, the placement of these borings, and the soil sampling depths will be determined based on the evolving CSM, and the quantities and/or locations indicated above and in Table C-1 and Figure C-5 are preliminary.

3.5.6 Study Area F

A total of 22 soil borings are proposed for Study Area F, however, 10 of them are not illustrated on Figure C-6, because the locations will be determined based on the results of the utility corridor survey, sub-slab sampling, soil gas sampling, and analytical results presented in the PPR. For costing purposes, it is assumed that a total of 22 soil borings will be advanced to depths ranging from 20 to 40 ft bgs. If the existing analytical data, utility corridor survey, sub-slab sampling, and the soil gas sampling do not discover any chlorinated solvent contamination within this study area, the number of soil borings advanced may be decreased, potentially excluding some of the 22 soil borings proposed for Study Area F. The number of soil borings, the placement of these borings, and the soil sampling depths will be determined based on the evolving CSM, and the quantities and/or locations indicated above and in Table C-1 and Figure C-6 are preliminary.

3.5.7 Study Area G

A total of 43 soil borings are proposed for Study Area G, however, 15 of them are not illustrated on Figure C-7, because the locations will be determined based on the results of the utility corridor survey, sub-slab sampling, soil gas sampling, and analytical results presented in the PPR. For costing purposes, it is assumed that a total of 38 soil borings will be advanced to depths ranging from 20 to 40 ft bgs. If the existing analytical data, utility corridor survey, sub-slab sampling, and the soil gas sampling do not discover any chlorinated solvent contamination within this study area, the number of soil borings advanced may be decreased, potentially excluding some of the 43 soil borings proposed for Study Area G. The number of soil borings, the placement of these borings, and the soil sampling depths will be determined based on the evolving CSM, and the quantities and/or locations indicated above and in Table C-1 and Figure C-7 are preliminary.

3.5.8 Study Area H

The soil borings proposed for Study Area H are not illustrated on Figure C-8, because the locations will be determined based on the results of the utility corridor survey, sub-slab sampling, soil gas sampling, and analytical results presented in the PPR. For costing purposes, it is assumed that a total of 10 soil borings will be advanced to depths ranging from 20 to 40 ft bgs. If the existing analytical data, utility corridor survey, sub-slab sampling, and the soil gas sampling do not discover any chlorinated solvent contamination within this study area, the number of soil borings advanced may be decreased, potentially excluding some of the 10 soil borings proposed for Study Area H. The number of soil borings, the placement of these borings, and the soil sampling depths will be determined based on the evolving CSM, and the quantities indicated above and in Table C-1 are preliminary.

3.5.9 Study Area I

A total of 14 soil borings are proposed for Study Area I, however, 10 of them are not illustrated on Figure C-9, because the locations will be determined based on the results of the utility corridor survey, sub-slab sampling, soil gas sampling, and analytical results presented in the PPR. For costing purposes, it is assumed that a total of 14 soil borings will be advanced to depths ranging from 20 to 40 ft bgs. If the existing analytical data, utility corridor survey, sub-slab sampling, and the soil gas sampling do not discover any chlorinated solvent contamination within this study area, the number of soil borings advanced may be decreased, potentially excluding some of the 14 soil borings proposed for Study Area I. The number of soil borings, the placement of these borings, and the soil sampling depths will be determined based on the evolving CSM, and the quantities and/or locations indicated above and in Table C-1 and Figure C-9 are preliminary.

3.5.10 Study Area J

The soil borings proposed for Study Area J are not illustrated on Figure C-10, because the locations will be determined based on the results of the utility corridor survey, sub-slab sampling, soil gas sampling, and analytical results presented in the PPR. For costing purposes, it is assumed that a total of 15 soil borings will be advanced to depths ranging from 20 to 40 ft bgs. If the existing analytical data, utility corridor survey, sub-slab sampling, and the soil gas sampling do not discover any chlorinated solvent contamination within this study area, the number of soil borings advanced may be decreased, potentially excluding some of the 15 soil borings proposed for Study Area J. The number of soil borings, the placement of these borings, and the soil sampling depths will be determined based on the evolving CSM, and the quantities indicated above and in Table C-1 are preliminary.

3.5.11 Study Area K

The soil borings proposed for Study Area K are not illustrated on Figure C-11, because the locations will be determined based on the results of the utility corridor survey, sub-slab sampling, soil gas sampling, and analytical results presented in the PPR. For costing purposes, it is assumed that a total of 15 soil borings will be advanced to depths ranging from 20 to 40 ft bgs. If the existing analytical data, utility corridor survey, sub-slab sampling, and the soil gas sampling do not discover any chlorinated solvent contamination within this study area, the number of soil borings advanced may be decreased, potentially excluding some of the 15 soil borings proposed for Study Area K. The number of soil borings, the placement of these borings, and the soil sampling depths will be determined based on the evolving CSM, and the quantities indicated above and in Table C-1 are preliminary.

3.5.12 Other Areas

2500 Curtiss Street

Although the property located at 2500 Curtiss Street is not within any of the Study Areas, a limited soil investigation is planned. The soil borings proposed for 2500 Curtiss Street are not illustrated on Figure C-12, because the locations will be determined based on the results of the utility corridor survey, sub-slab sampling, soil gas sampling, and analytical results presented in the PPR. For costing purposes, it is assumed that a total of 15 soil borings will be advanced to depths ranging from 20 to 40 ft bgs. If the utility corridor survey and the soil gas sampling do not discover any chlorinated solvent contamination within this study area, the number of soil borings advanced may be decreased, potentially excluding some of the 15 soil borings proposed for this property. The number of soil borings, the placement of these borings, and the soil sampling depths will be determined based on the evolving CSM, and the quantities indicated above and in Table C-1 are preliminary.

Property South of the Intersection of Curtiss and Glenview and East of Belmont

Although the property located south of the intersection of Curtiss and Glenview and east of Belmont is not within any of the Study Areas, a limited soil investigation is planned. The soil borings proposed for this property are not illustrated on Figure C-13, because the locations will be determined based on the results of the soil gas sampling and analytical results presented in the PPR. For costing purposes, it is assumed that a total of 10 soil borings will be advanced to depths ranging from 20 to 40 ft bgs. If the soil gas sampling does not discover any chlorinated solvent contamination within this study area, the number of soil borings advanced may be decreased, potentially excluding some of the 10 soil borings proposed for this property. The number of soil borings, the placement of these borings, and the soil sampling depths will be determined based on the evolving CSM, and the quantities indicated above and in Table C-1 are preliminary.

3.6 GROUNDWATER INVESTIGATION

As stated in Subsection 4.4.6 of the PPR, monitoring wells will be installed and groundwater samples will be collected (from both monitoring wells and grab groundwater samples) during the RI/FS in order to characterize potential sources, delineate chlorinated solvent contamination within the groundwater, characterize the site geology and hydrogeology, and to select where additional soil borings and monitoring wells should be advanced. Grab groundwater samples will be collected by the installation of a temporary 1-inch PVC piezometer in the soil borings (discussed in Subsection 3.5) at the depth where groundwater is encountered. Monitoring wells will be advanced using either standard hollow-stem auger (HSA) or sonic drilling techniques, and will be continuously logged by a qualified Geologist using the United Soil Classification System (USCS) to document and describe the subsurface geology. The monitoring well installation procedures, including development of the wells will be detailed in the QAPP/FSP, which will be prepared as part of the RI/FS. Soil borings advanced for the purposes of monitoring well installation will be advanced, logged, and screened for soil contamination in the manner described in Subsection 3.5 above. Soil samples may also be collected from soil borings advanced for the purposes of monitoring well installation. Monitoring wells installed in areas where more than one of the groundwater types (shallow, intermediate, bedrock) is present will be installed in nests, which are closely locate wells within different aquifers. Grab groundwater samples will be analyzed on-site using the DSITMS technology employed by the mobile laboratory. Groundwater samples collected from monitoring wells will be collected and sent to an off-site laboratory for analysis.

Following installation and development of the newly installed monitoring wells, all wells present at the site (existing and newly installed) will be tested to determine hydraulic conductivity. Hydraulic conductivity will be determined by performing a slug test, which will include both a rising and falling-head slug test. The slug testing procedures will be detailed in the QAPP/FSP, which will be prepared as part of the RI/FS.

The following sections examine the monitoring well installation and groundwater sampling activities proposed in each of the study areas individually. A subsection below is also included for areas where sampling will occur that is not within any of the study areas. However, the bedrock monitoring wells that will be installed at the site are not discussed below on an area-by-area basis, but are examined on a site-wide basis.

3.6.1 Study Area A

The proposed locations of the intermediate monitoring wells within Study Area A are illustrated on Figure C-1. The exact locations and number of monitoring wells within Study Area A will be determined based on the evolving CSM, the results of the previous phases of investigation, and field observations. Currently, seven intermediate wells are proposed for Study Area A, however, some of these wells could ultimately be classified as shallow or intermediate wells, subject to where groundwater is located. It is assumed that shallow groundwater samples within this area will be collected during the soil investigation as grab samples. The locations specified on Figure C-1 were based on existing data presented in the PPR, but are subject to revision during the field investigation. For example, if either shallow or intermediate groundwater is encountered in the areas of the proposed locations during the soil investigation, the wells will be relocated prior to installation. Also, based on the results of the soil investigation (both chemical and presence or lack of groundwater), the locations of the wells and also the proposed number may be modified.

3.6.2 Study Area B

The proposed locations of the intermediate monitoring wells within Study Area B are illustrated on Figure C-2. The exact locations and number of monitoring wells within Study Area B will be determined based on the evolving CSM, the results of the previous phases of investigation, and field observations. Currently, six intermediate wells are proposed for Study Area B, however, some of these wells could ultimately be classified as shallow or intermediate wells, subject to where groundwater is located. It is assumed that shallow groundwater samples within this area will be collected during the soil investigation as grab samples. The locations specified on Figure C-2 were based on existing data presented in the PPR, but are subject to revision during the field investigation. For example, if either shallow or intermediate groundwater is encountered in the areas of the proposed locations during the soil investigation, the wells will be relocated prior to installation. Also, based on the results of the soil investigation (both chemical and presence or lack of groundwater), the locations of the wells and also the proposed number may be modified.

3.6.3 Study Area C

The proposed locations of the shallow and intermediate monitoring wells within Study Area C are illustrated on Figure C-3. The exact locations and number of monitoring wells within Study Area C will be determined based on the evolving CSM, the results of the previous phases of investigation, and field observations. Currently, four shallow and eight intermediate wells are proposed for Study Area C, however, this distribution between shallow and intermediate is subject to where groundwater is detected. It is assumed that additional shallow groundwater samples within this area will be collected during the soil investigation as grab samples. The locations specified on Figure C-3 were based on existing data presented in the PPR, but are subject to revision during the field investigation. For example, if either shallow or intermediate groundwater is encountered in the areas of the proposed locations during the soil investigation, the wells will be relocated prior to installation. Also, based on the results of the soil investigation (both chemical and presence or lack of groundwater), the locations of the wells and also the proposed number may be modified.

3.6.4 Study Area D

The proposed locations of the shallow and intermediate monitoring wells within Study Area D are illustrated on Figure C-4. The exact locations and number of monitoring wells within Study Area D will be determined based on the evolving CSM, the results of the previous phases of investigation, and field observations. Currently, four shallow and 10 intermediate wells are proposed for Study Area D, however, this distribution between shallow and intermediate is subject to where groundwater is detected. It is assumed that additional shallow groundwater samples within this area will be collected during the soil investigation as grab samples. The locations specified on Figure C-4 were based on existing data presented in the PPR, but are subject to revision during the field investigation. For example, if either shallow or intermediate groundwater is encountered in the areas of the proposed locations during the soil investigation, the wells will be relocated prior to installation. Also, based on the results of the soil investigation (both chemical and presence or lack of groundwater), the locations of the wells and also the proposed number may be modified.

3.6.5 Study Area E

The proposed locations of the intermediate monitoring wells within Study Area E are illustrated on Figure C-5. The exact locations and number of monitoring wells within Study Area E will be determined based on the evolving CSM, the results of the previous phases of investigation, and field observations. Currently, three intermediate wells are proposed for Study Area E, however, some of these wells could ultimately be classified as shallow or intermediate wells, subject to where groundwater is located. It is assumed that shallow groundwater samples within this area will be collected during the soil investigation as grab samples. The locations specified on Figure C-5 were based on existing data presented in the PPR, but are subject to revision during the field investigation. For example, if either shallow or intermediate groundwater is encountered in the areas of the proposed locations during the soil investigation, the wells will be relocated prior to installation. Also, based on the results of the soil investigation (both chemical and presence or lack of groundwater), the locations of the wells and also the proposed number may be modified.

3.6.6 Study Area F

The proposed locations of the intermediate monitoring wells within Study Area F are illustrated on Figure C-6. The exact locations and number of monitoring wells within Study Area F will be determined based on the evolving CSM, the results of the previous phases of investigation, and field observations. Currently, four intermediate wells are proposed for Study Area F, however, some of these wells could ultimately be classified as shallow or intermediate wells, subject to where groundwater is located. It is assumed that shallow groundwater samples within this area will be collected during the soil investigation as grab samples. The locations specified on Figure C-6 were based on existing data presented in the PPR, but are subject to revision during the field investigation. For example, if either shallow or intermediate groundwater is encountered in the areas of the proposed locations during the soil investigation, the wells will be relocated prior to installation. Also, based on the results of the soil investigation (both chemical and presence or lack of groundwater), the locations of the wells and also the proposed number may be modified.

3.6.7 Study Area G

The proposed locations of the shallow and intermediate monitoring wells within Study Area G are illustrated on Figure C-7. The exact locations and number of monitoring wells within Study Area G will be determined based on the evolving CSM, the results of the previous phases of investigation, and field observations. Currently, six shallow and nine intermediate wells are proposed for Study Area G, however, this distribution between shallow and intermediate is subject to where groundwater is detected. It is assumed that additional shallow groundwater samples within this area will be collected during the soil investigation as grab samples. The locations specified on Figure C-7 were based on existing data presented in the PPR, but are subject to revision during the field investigation. For example, if either shallow or intermediate groundwater is encountered in the areas of the proposed locations during the soil investigation, the wells will be relocated prior to installation. Also, based on the results of the soil investigation (both chemical and presence or lack of groundwater), the locations of the wells and also the proposed number may be modified.

3.6.8 Study Area H

The proposed locations of the intermediate monitoring wells within Study Area H are illustrated on Figure C-8. The exact locations and number of monitoring wells within Study Area H will be determined based on the evolving CSM, the results of the previous phases of investigation, and field observations. Currently, three intermediate wells are proposed for Study Area H, however, some of these wells could ultimately be classified as shallow or intermediate wells, subject to where groundwater is located. It is assumed that shallow groundwater samples within this area will be collected during the soil investigation as grab samples. The locations specified on Figure C-8 were based on existing data presented in the PPR, but are subject to revision during the field investigation. For example, if either shallow or intermediate groundwater is encountered in the areas of the proposed locations during the soil investigation, the wells will be relocated prior to installation. Also, based on the results of the soil investigation (both chemical and presence or lack of groundwater), the locations of the wells and also the proposed number may be modified.

3.6.9 Study Area I

The proposed locations of the shallow and intermediate monitoring wells within Study Area I are illustrated on Figure C-9. The exact locations and number of monitoring wells within Study Area I will be determined based on the evolving CSM, the results of the previous phases of investigation, and field observations. Currently, three shallow and three intermediate wells are proposed for Study Area I, however, this distribution between shallow and intermediate is subject to where groundwater is detected. It is assumed that additional shallow groundwater samples within this area will be collected during the soil investigation as grab samples. The locations specified on Figure C-9 were based on existing data presented in the PPR, but are subject to revision during the field investigation. For example, if either shallow or intermediate groundwater is not encountered in the areas of the proposed locations during the soil investigation, the wells will be relocated prior to installation. Also, based on the results of the soil investigation (both chemical and presence or lack of groundwater), the locations of the wells and also the proposed number may be modified.

3.6.10 Study Area J

The proposed locations of the intermediate monitoring wells within Study Area J are illustrated on Figure C-10. The exact locations and number of monitoring wells within Study Area J will be determined based on the evolving CSM, the results of the previous phases of investigation, and field observations. Currently, three intermediate wells are proposed for Study Area J, however, some of these wells could ultimately be classified as shallow or intermediate wells, subject to where groundwater is located. It is assumed that shallow groundwater samples within this area will be collected during the soil investigation as grab samples. The locations specified on Figure C-10 were based on existing data presented in the PPR, but are subject to revision during the field investigation. For example, if either shallow or intermediate groundwater is encountered in the areas of the proposed locations during the soil investigation, the wells will be relocated prior to installation. Also, based on the results of the soil investigation (both chemical and presence or lack of groundwater), the locations of the wells and also the proposed number may be modified.

3.6.11 Study Area K

The proposed locations of the intermediate monitoring wells within Study Area K are illustrated on Figure C-11. The exact locations and number of monitoring wells within Study Area K will be determined based on the evolving CSM, the results of the previous phases of investigation, and field observations. Currently, four intermediate wells are proposed for Study Area K, however, some of these wells could ultimately be classified as shallow or intermediate wells, subject to where groundwater is located. It is assumed that shallow groundwater samples within this area will be collected during the soil investigation as grab samples. The locations specified on Figure C-11 were based on existing data presented in the PPR, but are subject to revision during the field investigation. For example, if either shallow or intermediate groundwater is encountered in the areas of the proposed locations during the soil investigation, the wells will be relocated prior to installation. Also, based on the results of the soil investigation (both chemical and presence or lack of groundwater), the locations of the wells and also the proposed number may be modified.

3.6.12 Other Areas

2500 Curtiss Street

The proposed locations of the intermediate monitoring wells within 2500 Curtiss Street are illustrated on Figure C-12. The exact locations and number of monitoring wells within Study Area A will be determined based on the evolving CSM, the results of the previous phases of investigation, and field observations. Currently, three intermediate wells are proposed for 2500 Curtiss Street, however, some of these wells could ultimately be classified as shallow or intermediate wells, subject to where groundwater is located. It is assumed that shallow groundwater samples within this area will be collected during the soil investigation as grab samples. The locations specified on Figure C-12 were based on existing data presented in the PPR, but are subject to revision during the field investigation. For example, if either shallow or intermediate groundwater is encountered in the areas of the proposed locations during the soil investigation, the wells will be relocated prior to installation. Also, based on the results of the soil investigation (both chemical and presence or lack of groundwater), the locations of the wells and also the proposed number may be modified.

Property South of the Intersection of Curtiss and Glenview and East of Belmont

The proposed locations of the intermediate monitoring wells within the property located south of the intersection of Curtiss and Glenview and east of Belmont are illustrated on Figure C-13. The exact locations and number of monitoring wells within Study Area A will be determined based on the evolving CSM, the results of the previous phases of investigation, and field observations. Currently, three intermediate wells are proposed for 2500 Curtiss Street, however, some of these wells could ultimately be classified as shallow or intermediate wells, subject to where groundwater is located. It is assumed that shallow groundwater samples within this area will be collected during the soil investigation as grab samples. The locations specified on Figure C-13 were based on existing data presented in the PPR, but are subject to revision during the field investigation. For example, if either shallow or intermediate groundwater is encountered during the soil investigation, the wells will be relocated prior to installation. Also, based on the results of the soil investigation (both chemical and presence or lack of groundwater), the locations of the wells and also the proposed number may be modified.

3.6.13 Bedrock Monitoring Wells

A total of ten new bedrock monitoring wells will be are proposed to be installed within OU1 during the RI/FS. The location of four of these proposed wells are shown on Figure C-14. The remainder of the locations will be determined based on the results of the soil and shallow/intermediate groundwater investigation. Monitoring wells will be advanced using sonic drilling techniques, and will be continuously logged by a qualified Geologist using the United Soil Classification System (USCS) to document and describe the subsurface geology.

In addition, four bedrock monitoring wells (including one well nest with shallow, intermediate, and bedrock wells) are proposed in areas outside of the Ellsworth Industrial Park OU1 boundary. The proposed locations of these wells are not illustrated on a figure because the information obtained from DuPage county, including parcel boundaries and orthophoto, did not extend to the areas where these wells were proposed. The four bedrock monitoring wells (including one well nest) will be installed at the following locations:

- In the shopping mall parking lot south of 63rd Street between Belmont and Woodward
- At the intersection of the ramps for I-355 and 63rd Street
- Near Hanson Road between Lee Street and Springside Avenue
- Pershing Road about halfway between 59th Street and Maple Avenue (well nest)

Additional information will be obtained from DuPage County and the locations of these monitoring wells will be plotted on figures prior to initiation of the field investigation.

3.6.14 Groundwater Monitoring

The scope of the RI includes one groundwater sampling event at all new and existing wells in OU1. The four off-site bedrock wells, including the well nest, will also be included in this sampling event.

All wells will be sampled and analyzed for VOCs. In addition, a subset of these wells will be analyzed for geochemical parameters to assess conditions for natural biodegradation and attenuation at the site. The wells selected for this natural attenuation monitoring will be selected to provide representative data across the subareas and hydrogeologic zones of interest and represent a cross-section of anticipated upgradient, in-plume, and downgradient conditions based on historical data and the grab soil and groundwater sampling. For costing purposes, it is anticipated that approximately 35 wells will be sampled for natural attenuation parameters. The natural attenuation parameters to be determined in these wells will include field measurements (dissolved oxygen, oxidation-reduction potential, pH, conductivity, temperature, ferrous iron, and manganese), as well as laboratory analyses (major anions, alkalinity, TOC, sulfide, and dissolved hydrocarbon gases).

A single monitoring event has been assumed for this RI. However, additional rounds of groundwater monitoring are anticipated to be necessary to adequately assess groundwater conditions at the site and the operation of natural attenuation mechanisms. For example, existing guidance for monitored natural attenuation recommends at least one year of quarterly monitoring to establish baseline conditions and seasonal variability (AFCEE 2000).

3.7 DATA VALIDATION

All analytical data received from the laboratories will be validated in accordance with the following guidelines:

- National Functional Guidelines for Organic Data Review, U.S. EPA, October 1999.
- National Functional Guidelines for Low Concentration Organic Data Review, U.S. EPA, June 2001.
- National Functional Guidelines for Superfund Organic Methods Data Review, U.S. EPA, January 2005.

The analytical results will be manually compared to the validation criteria, and the results of this comparison will be documented.

SECTION 4

REPORTING

The following subsections describe the reports that will be prepared as part of the RI/FS process.

4.1 DATA EVALUATION REPORT

Following completion of the investigation activities, a Data Evaluation Report will be prepared. This Data Evaluation Report will evaluate and present the results of the soil and groundwater sample data acquisition activities. The report will discuss the field activities carried out, present analytical results, identify the data set reviewed and the types of reviews the data were submitted to, and will discuss whether the data meets the project DQOs and are suitable for use in any subsequent RI/FS activities, including risk assessments. If deficiencies are noted, they will be documented and discussed, and their potential impact on the project will be assessed.

4.2 HUMAN HEALTH RISK ASSESSMENT

A baseline human health risk assessment (HHRA) will be conducted to determine whether site contaminants pose a current or potential risk to human health and the environment, in the absence of any remedial action. The HHRA will be conducted in accordance with U.S. EPA guidance, including *Risk Assessment Guidance for Superfund (RAGS), Volume 1-Human Health Evaluation Manual (Part A), Interim Final* (EPA-540-1-89-002, OSWER Directive 9285.7-01A), December 1989; and *Risk Assessment Guidance for Superfund (RAGS), Volume 1 - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments), Final* (EPA 540-R-97-033, OSWER 9285.7-01D), December 2001. The risk assessment will include discussions on the following areas: Hazard Identification; Dose-Response Assessment; Exposure/Pathway Analysis; Characterization of Site and Potential Receptors; Exposure

Assessment; Risk Characterization; and Identification of Limitations/Uncertainties.

The HHRA will use data from the site and nearby areas to identify the contaminants of concern (COCs), provide an estimate of how and to what extent human receptors might be exposed to these COCs currently and in the future, and provide an assessment of the health effects associated with these COCs. This HHRA will project the potential risk of health problems occurring if no remedial action is taken at the site and/or nearby areas and establish target action levels for COCs (carcinogenic and non-carcinogenic). The HHRA will also define central tendency and reasonable maximum estimates of exposure for current and anticipated future land use considerations.

4.3 ECOLOGICAL RISK ASSESSMENT

A Screening-Level Ecological Risk Assessment (SLERA) will initially be performed at the Ellsworth Industrial Park. The results of the SLERA will determine if an Ecological Risk Assessment is required. If an Ecological Risk Assessment is determined to be necessary, it will be conducted in accordance with U.S. EPA guidance, including *Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessments,* (EPA-540-R-97-006, June 1997, OSWER Directive 9287.7-25). This assessment will evaluate current and potential future risks to ecosystems posed by site contaminants and addresses the following areas: Hazard Identification; Dose-Response Assessment; Exposure/Pathway Analysis; Characterization of Site and Potential Receptors; Selection of Chemicals, Indicator Species, and End Points; Exposure Assessment; Toxicity Assessment/Ecological Effects Assessment; Risk Characterization; and Identification of Limitations/Uncertainties.

4.4 REMEDIAL INVESTIGATION REPORT

The Remedial Investigation (RI) report establishes the site characteristics such as media contaminated, extent of contamination, and the physical boundaries of the contamination. Pursuant to this objective, the RI Report will document detailed data necessary to determine the key contaminant(s) movement and extent of contamination. The key contaminant(s) will be selected based on persistence and mobility in the environment and extent of contamination. The key contaminant(s) identified in the RI will be evaluated for receptor exposure and an estimate of the key contaminant(s) level reaching human or environmental receptors will be made. Existing standards and guidelines will be used such as drinking-water standards, water-quality criteria, and other criteria accepted by the U.S. EPA, as appropriate for the situation may be used to evaluate effects on human receptors who may be exposed to the key contaminant(s) above appropriate standards or guidelines.

The RI Report will contain the following:

1. Introduction

    - Purpose of Report
    - Site Description and Background

        - Site Location and Physical Setting Including General Geology, Hydrology, Hydrogeology, Surrounding Land Use and Populations, Groundwater Use, Surface Water Bodies, Ecological Areas including Sensitive Ecosystems and Meteorology/Climatology

        - Past and Present Facility Operations/Site Usage and Disposal Practices, Including Waste Disposal/Operations Areas Based on Historical Air Photos

        - Previous Investigations and Results

    - Report Organization

2. Study Area Investigations, Procedures and Methodologies, Including a Detailed Description of All Field Activities Associated with Site Characterization and Any Deviations from Approved Planning Documents (i.e., Describe How the RI Was Conducted)

    - Detailed Sampling and Data Gathering Objectives; Data Gaps and Data Needs Identified During Project Scoping and Course of RI

        - Surface Features Inventory, Including Topographic Mapping, etc.

- Surrounding Land Use and Population Inventories/Surveys
- Meteorology/Climate Data Collection
- Waste Characterization Activities
- Surface and Subsurface Soils Investigations
- Hydrogeologic Investigations and Groundwater Use Inventories
- Surface Water and Sediment Investigations
- Ecological Investigations
- Treatability Studies

3. Physical Characteristics of the Study Area, Analytical Results and Modeling

   - Surface Features (Natural and Manmade) and Topography
   - Surrounding Land Use and Populations
   - Meteorology/Climate
   - Geology, Contaminant Source Areas, Waste Characterizations, Surface and Subsurface Soils, Hot Spots, Leachate, Analytical Data
   - Hydrogeology, Groundwater Conditions, Analytical Data, Contaminant Trends
   - Surface Water Hydrology and Surface Water, Sediment, Analytical Data
   - Ecological Characterization and Sensitive Ecosystems

4. Summary of the Nature and Extent of Contamination, Contaminant Fate and Transport and Modeling Results

   - Contaminant Source/Waste Areas, ~~and~~ Surface and Subsurface Soil Contamination, Hot Spots

     - Contaminant Concentrations; Quantity, Volume, Size and/or Magnitude of Contamination; Potential Routes of Migration; Physical and Chemical Attributes and Contaminant Persistence; Contaminant Fate and Transport Processes; Migration to Other Areas and Media; Modeling, Detected and Modeled Concentrations in Other Areas and Media

   - Groundwater Contaminants

     - Contaminant Concentrations; Quantity, Volume, Size and/or Magnitude of Contamination; Potential Routes of Migration; Physical and Chemical Attributes and Contaminant Persistence; Groundwater Use; Fate and Transport Processes; Migration to Other Areas and Media; Modeling; Detected and Modeled Concentrations in Other Areas and Media

   - Surface Water and Sediments

- Contaminants and Concentrations; Quantity, Volume, Size and/or Magnitude of Contamination; Potential Routes of Migration; Physical and Chemical Attributes and Contaminant Persistence; Contaminant Fate and Transport Processes; Migration to Other Areas and Media; Modeling; Detected and Modeled Concentrations in Other Areas and Media

5. Summary and Conclusions

    - Summary

        - Nature and Extent of Contamination
        - Fate and Transport

    - Conclusions

        - Data Limitations and Recommendations for Future Work

6. References

7. Tables and Figures

8. Appendices

    - Log Books
    - Soil Boring Logs
    - Test Pit/Trenching Logs
    - Landfill/Soil Gas Probe Construction Diagrams
    - Direct Soil Solute Sampling Construction Diagrams
    - Monitoring Well Construction Diagrams
    - Sample Collection Logs
    - Private and Public Well Records
    - Analytical Data and Data Validation Reports
    - Detailed Modeling Reports

4.5 REMEDIAL ALTERNATIVES TECHNICAL MEMORANDUM

Following completion and approval of the RI Report, remedial alternatives will be developed that will undergo full evaluation. The alternatives will encompass a range including innovative treatment technologies consistent with the regulations outlined in the National Contingency Plan (NCP), 40

CFR Part 300, the *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (OSWER Directive 9355.3-01), and other OSWER directives including 9355.4-03, October 18, 1989, and 9283.1-06, May 27, 1992, *Considerations in Ground Water Remediation at Superfund Sites*, as well as other applicable and more recent guidance, policies or procedures.

Alternatives will only be examined if they will remediate or control contaminated media (soil, surface water, ground water, sediments) remaining at the site, as deemed necessary in the RI, to provide adequate protection of human health and the environment. The potential alternatives will encompass, as appropriate, a range of alternatives in which treatment is used to reduce the toxicity, mobility, or volume of wastes but vary in the degree to which long-term management of residuals or untreated waste is required, one or more alternatives involving containment with little or no treatment; and a no-action alternative. Alternatives that involve minimal efforts to reduce potential exposures (e.g., site fencing, deed restrictions) will be presented as "limited action" alternatives.

4.6 FEASIBILITY STUDY

A Feasibility Study Report will be prepared, which will contain a detailed analysis of remedial alternatives to provide U.S. EPA with the information needed to select an appropriate remedy for the Ellsworth Industrial Park. The FS Report will summarize the development and screening of the remedial alternatives and present the detailed analysis of remedial alternatives. In addition, the FS Report will also include information necessary to U.S. EPA for preparation of relevant sections of the Record of Decision (ROD) for the Site (Chapters 6 and 9 of U.S. EPA's *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (EPA 540-R-98-031, July 1999) for the information that is needed].

A detailed analysis of the remedial alternatives for the Ellsworth Industrial Park Site will be conducted. The detailed analysis will include an analysis of each remedial option against a set of nine evaluation criteria, and a comparative analysis of all options using the same nine criteria as a basis for comparison.

Apply Nine Criteria and Document Analysis

The nine evaluation criteria will be applied to the assembled remedial alternatives to ensure that the selected remedial alternative will protect human health and the environment and meet remedial action objectives; will comply with, or include a waiver of, ARARs; will be cost-effective; will utilize permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable; and will address the statutory preference for treatment as a principal element. The evaluation criteria include: (1) overall protection of human health and the environment and how the alternative meets each of the remedial action objectives; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume; (5) short-term effectiveness; (6) implementability; (7) cost; (8) state (or support agency) acceptance; and (9) community acceptance. Each alternative shall provide: (1) A description of the alternative that outlines the waste management strategy involved and identifies the key ARARs associated with each alternative, and (2) A discussion of the individual criterion assessment.

Compare Alternatives Against Each Other and Document the Comparison of Alternatives

A comparative analysis between the remedial alternatives will also be performed. Each alternative will be compared against the other alternatives using the evaluation criteria as a basis of comparison. U.S. EPA will then identify and select the preferred alternative.

SECTION 5

MISCELLANEOUS

5.1 INVESTIGATIVE-DERIVED WASTE

During the investigation, investigative-derived waste (IDW) will be generated during investigative activities. Examples of IDW are soil cuttings, decontamination water, monitoring well purge water, and personal protection equipment (PPE). It is anticipated that 55-gallon drums of IDW will be temporarily stored on-site within a specified area of the site designated and approved by U.S. EPA and the PRP Group. Following completion of the investigative activities, the IDW will be characterized and disposed of in accordance with local, State, and Federal regulations. IDW management programs will be described in the SMP.

5.2 PROJECT MANAGEMENT

During the course of the RI/FS process, the organization conducting the work will continue to provide U.S. EPA with project management related to the general work assignment and management and coordination to implement the SOW. The following tasks will be completed as part of the project management:

- Preparation of monthly technical and financial reports in accordance with the RAC Region V Contract.
- Review of weekly reports, cost tracking, and submittal of invoices.
- Manage and track costs and prepare and submit invoices.

SECTION 6

ESTIMATED COSTS

The estimated costs for the RI/FS project are summarized in Table C-2. In addition, underlying assumptions associated with the estimated costs have been listed in Table C-2. The costs listed in Table C-2 are based on the preliminary scope of work detailed in the previous sections. During the investigation, which is a phased approach, the scope of work will be revised continuously based on the evolving CSM. The actual scope of work that is performed during each phase of work will be based on the results of the previous phase and the evolving CSM. Therefore, the costs are subject to modification based on the actual scope of work that is implemented during the investigation.

In addition, the potential exists for the total cost listed in Appendix C, Table C-2 to decrease if the Ellsworth Group elects to have U.S. EPA perform the RI/FS. The potential cost savings would be a result of U.S. EPA utilizing internal resources, such as:

- U.S. EPA's Region 5 Central Regional Laboratory (CRL) for analytical support;
- U.S. EPA FIELDS Group for data management, GIS, and mapping support; and
- U.S. EPA's Region 5 Mobile Laboratory for on-site analytical support during all phases of the investigation.

TABLES

Tabi. ..-1
Investigation Summary by Area
Preliminary Planning Report
Ellsworth Industrial Park
Downers Grove, Illinois

Area of Interest	Sub-Slab Samples Proposed	Passive Soil Gas Samples Proposed	Soil Borings Proposed	Grab Groundwater Samples Proposed	Shallow Monitoring Wells Proposed	Intermediate Monitoring Wells Proposed
Study Area A	6	126	21	11	0	7
Study Area B	11	88	24	12	0	6
Study Area C	14	123	55	28	4	8
Study Area D	12	79	27	14	4	10
Study Area E	2	86	18	9	0	3
Study Area F	5	79	22	11	0	4
Study Area G	11	111	43	22	6	9
Study Area H	2	30	10	5	0	3
Study Area I	5	66	14	7	3	3
Study Area J	5	34	15	8	0	3
Study Area K	5	37	15	8	0	4
2500 Curtiss	5	51	15	8	0	3
Property South of the Intersection of Curtiss and Glenview and East of Belmont	0	20	10	5	0	3
TOTAL	**83**	**930**	**289**	**148**	**17**	**66**

I:\WO\RAC\233\36014TC-1.XLS

RFW233-2A-AVBQ

Table C-2
Cost Estimate for Remedial Investigation/Feasibility Study
Ellsworth Industrial Park - OU1
U.S. EPA
Downers Grove, Illinois

	ENGINEER'S ESTIMATES					COMMENTS
	Quantity	Unit	Unit Price	Cost	Subtotal	
PROJECT PLANNING COSTS						
SITE MANAGEMENT PLAN						
Labor	50	HOUR	$85	$4,250		Weighted average hourly rate used for Site Manager, Project Engineer, Project Geologist, etc.
Expenses	5	EST	$50	$250		Expenses include copies, CAD usage fees, plotting of large documents, and shipping costs for final reports.
					$4,500	
HEALTH AND SAFETY PLAN						
Labor	50	HOUR	$85	$4,250		Weighted average hourly rate used for Site Manager, Field Team Leader, H&S Specialist, etc
Expenses	5	EST	$125	$625		Expenses include copies, CAD usage fees, plotting of large documents, and shipping costs for final reports.
					$4,875	
QUALITY ASSURANCE PROJECT PLAN						
Labor	150	HOUR	$85	$12,750		Weighted average hourly rate used for Site Manager, Project Engineer, Project Geologist, etc.
Expenses	5	EST	$200	$1,000		Expenses include copies, CAD usage fees, plotting of large documents, and shipping costs for final reports.
					$13,750	
FIELD SAMPLING PLAN						
Labor	150	HOUR	$85	$12,750		Weighted average hourly rate used for Site Manager, Project Engineer, Project Geologist, etc.
Expenses	5	EST	$200	$1,000		Expenses include copies, CAD usage fees, plotting of large documents, and shipping costs for final reports.
					$13,750	
DATA MANAGEMENT PLAN						Cost assumes that U.S. EPA FIELDS will provide significant input/support in preparation of this document.
Labor	100	HOUR	$85	$8,500		Weighted average hourly rate used for Site Manager, Data Manager, GIS Specialist etc.
Expenses	5	EST	$125	$625		Expenses include copies, CAD usage fees, plotting of large documents, and shipping costs for final reports.
					$9,125	
PROJECT PLANNING COST SUBTOTAL					$46,000	
REMEDIAL INVESTIGATION COSTS						
SUBCONTRACTOR PROCUREMENT						
Labor	150	HOUR	$90	$13,500		Cost assumes that a total of 6 subcontractors are required for the investigation (25 hours per subcontractor)
Expenses	10	EST	$50	$500		
					$14,000	
MOBILIZATION/DEMOBILIZATION	1	EST	$25,000	$25,000		Cost assumes that investigation will only require one mobilization for each of the subcontractors.
					$25,000	Cost assumes that PRPs will have marked all utility corridors on their respective private properties prior to
UTILITY CORRIDOR INVESTIGATION						
COLLECT AND ANALYZE EXISTING INFORMATION						Assumes that all facility owners will provide records of underground utilities in a usable format.
Field Scientist	8	HR	$80	$640		Assumes that data from DuPage County can be obtained in one 8-hour day.
CAD Operator	24	HR	$75	$1,800		Assumes that data from DuPage County will require digitization from blueprints into AutoCAD.
Rental Vehicle	1	DAY	$95	$95		Assumes that one rental vehicle will be required during duration of project. Unit cost includes gas and tolls.
Copying Services	100	EACH	$2.00	$200		Assumes that copies of the DuPage County drawings will be required. Assume C or D size B&W copies.
CONDUCT INVESTIGATION						
Field Team Leader	120	HR	$90	$10,800		Assumes Field Team Leader will be onsite during all activities. Assume 10 hours per day.
Field Scientist	100	HR	$80	$8,000		Assumes Field Scientist will only be onsite during HAPSITE Laboratory sampling, not during utility location. Assume 10 hours per day.
Rental Vehicle	12	DAY	$95	$1,140		Assumes only one rental vehicle required during this phase of investigation. Unit cost includes gas and tolls
Sampling Supplies	10	DAY	$150	$1,500		Sampling supplies includes air monitoring equipment, H&S equipment, PPE, and disposable sampling supplies (scoops, Ziploc baggies, etc.)
Private Utility Locator/Surveyor	2	DAY	$800	$1,600		Assumes 2 days of utility location will be required to determine location of underground utilities not marked by JULIE. Assumes that radio/video sewer survey is not required.
HAPSITE Laboratory	10	DAY	$2,500	$25,000		Assumes portable GC/MS HAPSITE unit will be used to screen vapors for chlorinated solvent contamination. Cost includes operators of HAPSITE unit and all associated costs (lodging, per diem, laboratory supplies, etc.) Cost based on TTEMI estimate.
					$50,775	

Table C-2
Cost Estimate for Remedial Investigation/Feasibility Study
Ellsworth Industrial Park - OU1
U.S. EPA
Downers Grove, Illinois

	ENGINEER'S ESTIMATES					COMMENTS
	Quantity	Unit	Unit Price	Cost	Subtotal	
SUB-SLAB MONITORING						
Field Team Leader	130	HR	$90	$11,700		Assumes that Field Team Leader and Field Scientist install passive soil gas samplers below building slabs. Assume 10 hours per day. Field Team Leader will determine sampling locations based on historical data and visual observations during a 5-day building inspection. Field Team Leader will also oversee concrete coring (4 day duration), which will take place prior to installation effort for passive soil gas samplers.
Field Scientist	40	HR	$80	$3,200		Assumes overall duration of installation/remova of passive soil gas samplers is 4 days. Assume 10 hours per day. Installation rate for sub-slab samples is greatly reduced because of compacted subsurface material located below building slabs. Installation/removal rate based on TTEMI estimate.
Rental Vehicle	17	DAY	$95	$1,615		Assumes that two rental vehicles will be required during duration of project. Unit cost includes gas and tolls.
Sampling Supplies	4	DAY	$100	$400		Sampling supplies includes air monitoring equipment. H&S equipment. PPE, and hammer drill, and any other installation equipment necessary.
Concrete Coring Subcontractor	4	DAY	$1,000	$4,000		Assumes 4 days of concrete coring through building slabs.
PASSIVE SOIL GAS SUBCONTRACTOR						Passive Soil Gas costs & installation rates based on TTEMI estimates. Assume all installation is performed by Project Team (not the subcontractor).
Equipment Preparation and Shipping	1	EACH	$300	$300		*Cost to prepare samplers and ship to site.*
Sample Analysis	92	SAMPLE	$140	$12,880		Analysis of samples by EPA Method 8260B. Sample quantity includes 10% Field Duplicates (83 locations sampled).
EMFLUX Modeling	83	SAMPLE	$15	$1,242		Modeling of sample times in relation to gravitational forces that cause upward migration of subsurface vapors. Modeling only required per location, does not include duplicate samples.
					$35,337	
PASSIVE SOIL GAS INVESTIGATION						
Field Team Leader	170	HR	$90	$15,300		Assumes that Field Team Leader and two Field Scientists install passive soil gas samplers. Assume 10 hours per day. Field Team Leader will oversee concrete coring (5 day duration), which will take place prior to installation effort for passive soil gas samplers.
Field Scientist	240	HR	$80	$19,200		Overall duration (11 days: 870 locations installed in 6 days and removed in 6 days) assumes that approximately 85 locations can be installed or removedper day per 2-person field crew. Removal rate is slightly higher than installation rate. Assume two field scientists at 10 hours per day will be installing/removingas one field crew and Subcontractor's personnel as second field crew.
Rental Vehicle	41	DAY	$95	$3,895		Assumes that three rental vehicles will be required during duration of project. Unit cost includes gas and tolls
Sampling Supplies	24	DAY	$200	$4,800		Sampling supplies includes air monitoring equipment. H&S equipment. PPE, and hammer drill, and any other installation equipment necessary.
Direct-Push Subcontractor	5	DAY	$1,250	$6,250		Assumes direct push rig will be required for 5 days to install passive soil gas samples at depths greater than 3 ft bgs.
Concrete Coring Subcontractor	5	DAY	$1,000	$5,000		Assumes 5 days of concrete coring through sidewalks, asphalt parking lots, concrete parking lots, and concrete ramps in loading dock areas.
PASSIVE SOIL GAS SUBCONTRACTOR						Passive Soil Gas costs & installation rates based on TTEMI estimates. Assume all installation is performed by Project Team (not the subcontractor).
Equipment Preparation and Shipping	1	EACH	$300	$300		Cost to prepare samplers and ship to site.
Sample Analysis	1,023	SAMPLE	$140	$143,220		Analysis of samples by EPA Method 8260B. Sample quantity includes 10% Field Duplicates (930 locations sampled).
EMFLUX Modeling	930	SAMPLE	$15	$13,950		Modeling of sample times in relation to gravitational forces that cause upward migration of subsurface vapors. Modeling only required per location, does not include duplicate samples.
Subcontractor Installation Labor	1	EACH	$22,000	$22,000		Assumes two Subcontractor personnel will be one of the sample installation crews. Lump sum cost includes mobilization, airfare, lodging, per diem, rental vehicle, and demobilization.
					$233,915	

Table C-2
Cost Estimate for Remedial Investigation/Feasibility Study
Ellsworth Industrial Park - OU1
U.S. EPA
Downers Grove, Illinois

	ENGINEER'S ESTIMATES					COMMENTS
	Quantity	Unit	Unit Price	Cost	Subtotal	
SOIL SAMPLING						
Field Team Leader	440	HR	$90	$39,600		Assumes that Field Team Leader will be at site during entire duration (utility location, concrete coring, Direct Push, EP-Sonic). Assume 10 hours per day.
Field Geologist/Hydrogeologist	560	HR	$80	$44,800		Assumes that two Project Geologist/Hydrogeologist will be at site during all Direct Push drilling activities, and each will oversee a rig. During EP-Sonic drilling, only one Project Geologist/Hydrogeologistwill be required (along with Field Team Leader).
Sample Coordinator/GIS Specialist	370	HR	$75	$27,750		Assumes that Sample Coordinator/GIS Specialist will be required at the site during all drilling/samplingactivities and will manage samples and coordinate with U.S. EPA FIELDS mobile GIS laboratory. Assume 10 hours per day.
Rental Vehicle	100	DAY	$95	$9,500		Assumes that one rental vehicle will be required per person (excluding Sample Coordinator) during duration of project. Unit cost includes gas and tolls.
Field Supplies	56	DAY	$275	$15,400		Sampling supplies includes air monitoring equipment, H&S equipment, PPE, and disposable sampling supplies (scoops, baggies, etc.).
Private Utility Locator	5	DAY	$800	$4,000		Private utility locator is required on private property that will not be located by JULIE.
Drilling Subcontractor - EP Sonic Drilling	3,480	LF	$25	$87,000		Assumes that 20% of soil borings (58 borings) will be advanced with EP-Sonic drilling methods. These soil borings will be advanced until bedrock is encountered (assume 60 ft bgs). Assumes EP-Sonic drilling does not occur simultaneously with Direct Push sampling. Assumes that some grab groundwater sampling will be completed during soil investigation. Additional labor for grab groundwater sampling is included here. Cost based on TTEMI estimate
Drilling Subcontractor - Direct Push	38	DAY	$1,250	$47,500		Assumes that 2 Direct Push rigs will be operating at the site during soil sampling activities. Duration calculated using production rate of 150 LF per rig per day, and an average depth of borings listed in Table C-1 of 25 ft bgs. Assumes that some grab groundwater sampling will be completed during soil investigation. Additional labor for grab groundwater sampling is included here.
DSITMS Mobile Laboratory Subcontractor	45	DAY	$3,400	$153,000		Assumes that DSITMS Mobile Laboratory will have a sample throughput of 30 samples per day. Also assumes duration is 20% longer than drilling duration. Cost based on TTEMI estimate.
Concrete Coring Subcontractor	2	DAY	$1,000	$2,000		Assumes that 2 days of concrete coring will be required in areas where Direct Push will not be able to push through concrete surface.
GEOTECHNICAL LABORATORY SUBCONTRACTOR						
Granular Soil	30	SAMPLE	$250	$7,500		Assumes TOC, grain size, cation exchange, and redox potential analysis performed.
Low Permeability Soil	30	SAMPLE	$450	$13,500		Assumes TOC, grain size, and in-situ hydraulic conductivity analysis performed
Off-Site Laboratory - VOCs in Soil	297	SAMPLE	$145	$43,065		Assumes that 20% of the on-site analysis will be analyzed by off-site laboratory for QA/QC purposes. Sample quantity assumes 10% Field Duplicates.
					$494,615	
GROUNDWATER INVESTIGATION						
Field Team Leader	590	HR	$90	$53,100		Assumes Field Team Leader will be present during all activities (utility locate, HSA well installation, and Sonic well installation).
Field Geologist/Hydrogeologist	600	HR	$80	$48,000		Assumes two Field Geologist/Hydrogeologis will be overseeing the installation of monitoring wells. Assume 10 hours per day. Assume only Field Team Leader will oversee well development.
Rental Vehicle	97	DAY	$95	$9,215		Assumes two rental vehicles are required during well installation (HSA and Sonic). Also, one will be required during private utility location and well development. Unit cost includes gas and tolls.
Field Supplies	55	DAY	$150	$8,250		Supplies includes air monitoring equipment, H&S equipment, PPE.
Private Utility Locator	4	DAY	$800	$3,200		Private utility locator is required on private property that will not be located by JULIE.
DRILLING SUBCONTRACTOR						
HSA Well Installation	20	DAY	$1,500	$30,000		Assumes HSA can advance approximately 150 LF of monitoring wells per day.
Monitoring Well Construction - HSA	2,980	LF	$50	$149,000		Assumes 2-inch stainless steel wells installed to depths ranging from 20 to 60 ft bgs. Assume average depth of proposed shallow wells listed in Table C-1 is 20 ft, and average depth of intermediate wells listed in Table C-1 is 40 ft.
Grab Groundwater Sampling	140	EACH	$100	$14,000		Assume that grab groundwater samples will be collected from 50% of the soil borings advanced during soil investigation. Unit cost includes cost of temporary piezometer (1-inch PVC) and contractor installation. Assumes all grab groundwater samples will be analyzed on-site by mobile laboratory.
Sonic Drilling Well Installation - Inside OU1 Boundaries	1,000	LF	$100	$100,000		Assumes that 10 wells will be installed to an approximate depth of 100 ft bgs. Assume duration of well installation will be 10 days. Unit cost includes rig, operators, and well construction materials. Cost based on TTEMI estimate.
Sonic Drilling Well Installation - Outside OU1 Boundaries	490	LF	$100	$49,000		Assumes that 4 wells will be installed to an approximate depth of 100 ft bgs. Also assume the shallow well will be installed to an approximate depth of 30 ft bgs and the intermediate well will be installed to a depth of 60 ft bgs. Assume duration of well installation will be 5 days. Unit cost includes rig, operators, and well construction materials. Cost based on TTEMI estimate.
Well Development	20	DAY	$1,000	$20,000		Assume all newly installed wells will require development. Drilling subcontractor can develop 5 wells per day.

Table C-2
Cost Estimate for Remedial Investigation/Feasibility Study
Ellsworth Industrial Park - OU1
U.S. EPA
Downers Grove, Illinois

	ENGINEER'S ESTIMATES					COMMENTS
	Quantity	Unit	Unit Price	Cost	Subtotal	
GROUNDWATER SAMPLE COLLECTION						
Field Team Leader	130	HR	$90	$11,700		Assumes that Field Team Leader and three Field Geo/Hydros will perform sampling together in two teams. Assume that approximately 5 wells can be sampled per day per team (10 wells total per day), and that a total of 139 wells will be sampled.
Field Geologist/Hydrogeologist	390	HR	$80	$31,200		Assumes 10 hours per day.
Sample Coordinator/GIS Specialist	130	HR	$75	$9,750		Assumes 10 hours per day.
Rental Vehicle	26	DAY	$95	$2,470		Assumes two rental vehicles will be required at the site during slug testing. Unit cost includes gas and tolls.
Sampling Supplies	13	DAY	$650	$8,450		Assumes two bladder pumps and other equipment will be required for the two teams to collect samples from the monitoring wells. Unit cost is for all equipment. Cost includes Hach kits and reagents and YSI and flow-thru cells for MNA parameters.
Off-Site Analytical Samples - VOCs in Water	181	SAMPLE	$100	$18,100		Assume all samples from monitoring wells will be analyzed by an off-site laboratory. Assume 40 existing wells, 10 OU1 bedrock wells, 6 OU2 wells (four bedrock and two within nest) and 83 shallow/intermediate wells. Sample quantity assumes 10% Field Duplicates, 10% Field Blanks, and 10% Trip Blanks.
Off-Site Analytical Samples - MNA Parameters in Water	39	SAMPLE	$300	$11,700		Assume that 35 samples (+10% duplicates) will be collected for analysis of MNA parameters, which include major anions, alkalinity, sulfide, TOC, and methane, ethane & ethene.
SLUG TESTING						
Field Team Leader	120	HR	$90	$10,800		Assumes that Field Team Leader and Field Geo/Hydro will each perform slug testing separately. Assume that each person can complete 6 slug tests per day, and that a total of 139 wells will be slug tested.
Field Geologist/Hydrogeologist	120	HR	$80	$9,600		Assumes 10 hours per day.
Rental Vehicle	24	DAY	$95	$2,280		Assumes two rental vehicles will be required at the site during slug testing. Unit cost includes gas and tolls.
Slug Testing Supplies	24	DAY	$250	$6,000		Assumes two sets of equipment will be required at the site during slug testing.
WATER LEVEL MEASUREMENTS						
Field Team Leader	12	HR	$90	$1,080		Assumes all water level measurements will be collected in one day. Assume 12 hour day.
Field Scientist	24	HR	$75	$1,800		Assumes two Field Scientists will be required to collect a full round of water level measurements in one day. Assume 12 hour day.
Rental Vehicle	2	DAY	$95	$190		Assumes two rental vehicles required to collect all measurements during one day. Unit cost includes gas and tolls.
Water Level Indicator	3	DAY	$25	$75		Assume each person will use one water level indicator during the round of measurements.
					$608,960	
DATA VALIDATION	40	HOUR	$90	$3,600		Labor estimate assumes that all laboratory data will require validation by a data validator.
					$3,600	
REMEDIAL INVESTIGATION COST SUBTOTAL					$1,466,202	
REPORTING COSTS						
DATA EVALUATION REPORT						
Labor	*200*	*HOUR*	*$85*	*$17,000*		*Weighted average hourly rate used for Site Manager, Project Engineer, Project Geologist, etc.*
Expenses	1	EST	$1,000	$1,000		Expenses include copies, CAD usage fees, plotting of large documents, and shipping costs for final reports.
					$18,000	
HUMAN HEALTH RISK ASSESSMENT REPORT						
Labor	250	HOUR	$85	$21,250		Weighted average hourly rate used for Site Manager, Senior Risk Assessor, Junior Risk Assessor, etc.
Expenses	1	EST	$500	$500		Expenses include copies, CAD usage fees, plotting of large documents, and shipping costs for final reports.
					$21,750	
SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT REPORT						Assumes that SLERA will determine that a full Ecological Risk Assessment is not necessary.
Labor	40	HOUR	$85	$3,400		Weighted average hourly rate used for Site Manager, Senior Risk Assessor, Junior Risk Assessor, etc.
Expenses	1	EST	$500	$500		Expenses include copies, CAD usage fees, plotting of large documents, and shipping costs for final reports.
					$3,900	
REMEDIAL INVESTIGATION REPORT						
Labor	475	HOUR	$85	$40,375		Weighted average hourly rate used for Site Manager, Project Engineer, Project Geologist, etc.
Expenses	1	EST	$2,500	$2,500		Expenses include copies, CAD usage fees, plotting of large documents, and shipping costs for final reports.
					$42,875	

Table C-2
Cost Estimate for Remedial Investigation/Feasibility Study
Ellsworth Industrial Park - OU1
U.S. EPA
Downers Grove, Illinois

	ENGINEER'S ESTIMATES					COMMENTS
	Quantity	Unit	Unit Price	Cost	Subtotal	
REMEDIAL ALTERNATIVES TECHNICAL MEMORANDUM						
Labor	250	HOUR	$85	$21,250		Weighted average hourly rate used for Site Manager, Project Engineer, Project Geologist, etc.
Expenses	1	EST	$200	$200		Expenses include copies, CAD usage fees, plotting of large documents, and shipping costs for final reports.
					$21,450	
FEASIBILITY STUDY REPORT						
Labor	475	HOUR	$85	$40,375		Weighted average hourly rate used for Site Manager, Project Engineer, Project Geologist, etc.
Expenses	1	EST	$1,000	$1,000		Expenses include copies, CAD usage fees, plotting of large documents, and shipping costs for final reports.
					$41,375	
REPORTING COST SUBTOTAL					$149,350	
MISCELLANEOUS COSTS						
INVESTIGATIVE-DERIVED WASTE						
Characterization Sampling	12	SAMPLE	$1,000	$12,000		Cost assumes that 12 samples are sufficient for waste characterization.
Disposal of Liquid IDW	100	DRUM	$125	$12,500		Unit cost assumes that drummed waste can be disposed of as a Special Waste
Disposal of Solid IDW	350	DRUM	$125	$43,750		Unit cost assumes that drummed waste can be disposed of as a Special Waste.
					$68,250	
PROJECT MANAGEMENT						
Monthly Reporting	12	MONTH	$1,500	$18,000		Assumes 12 month period of performance.
					$18,000	
MISCELLANEOUS COST SUBTOTAL					$86,250	
SUB-TOTAL of PROJECT PLANNING COSTS					$46,000	
SUB-TOTAL of REMEDIAL INVESTIGATION COSTS					$1,466,300	
SUB-TOTAL of REPORTING COSTS					$149,400	
SUB-TOTAL of MISCELLANEOUS COSTS					$86,300	
TOTAL COST					$1,748,000	

FIGURES

RESPONSE ACTION CONTRACT
US EPA Contract No. 68-W7-0026
Work Assignment No. RFW233-RICO-B52A
Document Control No. RFW233-2A-AVBQ

WESTON SOLUTIONS

Ellsworth Industrial Park - OU1
Downers Grove, Illinois

Weston Solutions, Inc.
750 E. Bunker Ct., Suite 500
Vernon Hills, IL 60061
847-918-4000
http://www.westonsolutions.com

Proposed Sampling Locations Study Area B

WORK ORDER No.:	PROJECT MANAGER:	
DRAWN BY: NJK	CHECKED BY:	
DRAWING NAME:	DIRECTORY/ FOLDER: D:\Ellsworth_Industrial\apr\01_20_06_sow_d.apr	
CONTRACT No.:	DELIVERY ORDER No.:	
SCALE:	REPORT DATE:	
DATE: March 2006	REVISION No.:	FIGURE No.: C-2

LEGEND:

- Proposed Intermediate Monitoring Well Location
- Proposed Shallow Monitoring Well Location
- Anticipated Sub-Slab Gas Sampling Location
- Proposed Soil Boring Location
- Passive Soil Gas Sample Locations
- Existing OU1 Sample Locations
- Primary Study Areas
- Secondary Study Areas
- Parcel Boundaries
- OU1 Boundary
- Buildings
- Railroads
- Roads
- Rivers

Notes: Wells located in close proximity indicate a well nest.

N

0 120 Feet

RESPONSE ACTION CONTRACT
US EPA Contract No. 68-W7-0026
Work Assignment No. RFW233-RICO-B52A
Document Control No. RFW233-2A-AVBQ

WESTON SOLUTIONS

Ellsworth Industrial Park - OU1
Downers Grove, Illinois

Weston Solutions, Inc.
750 E. Bunker Ct., Suite 500
Vernon Hills, IL 60061
847-918-4000
http://www.westonsolutions.com

Proposed Sampling Locations Study Area G

WORK ORDER No.:	PROJECT MANAGER:
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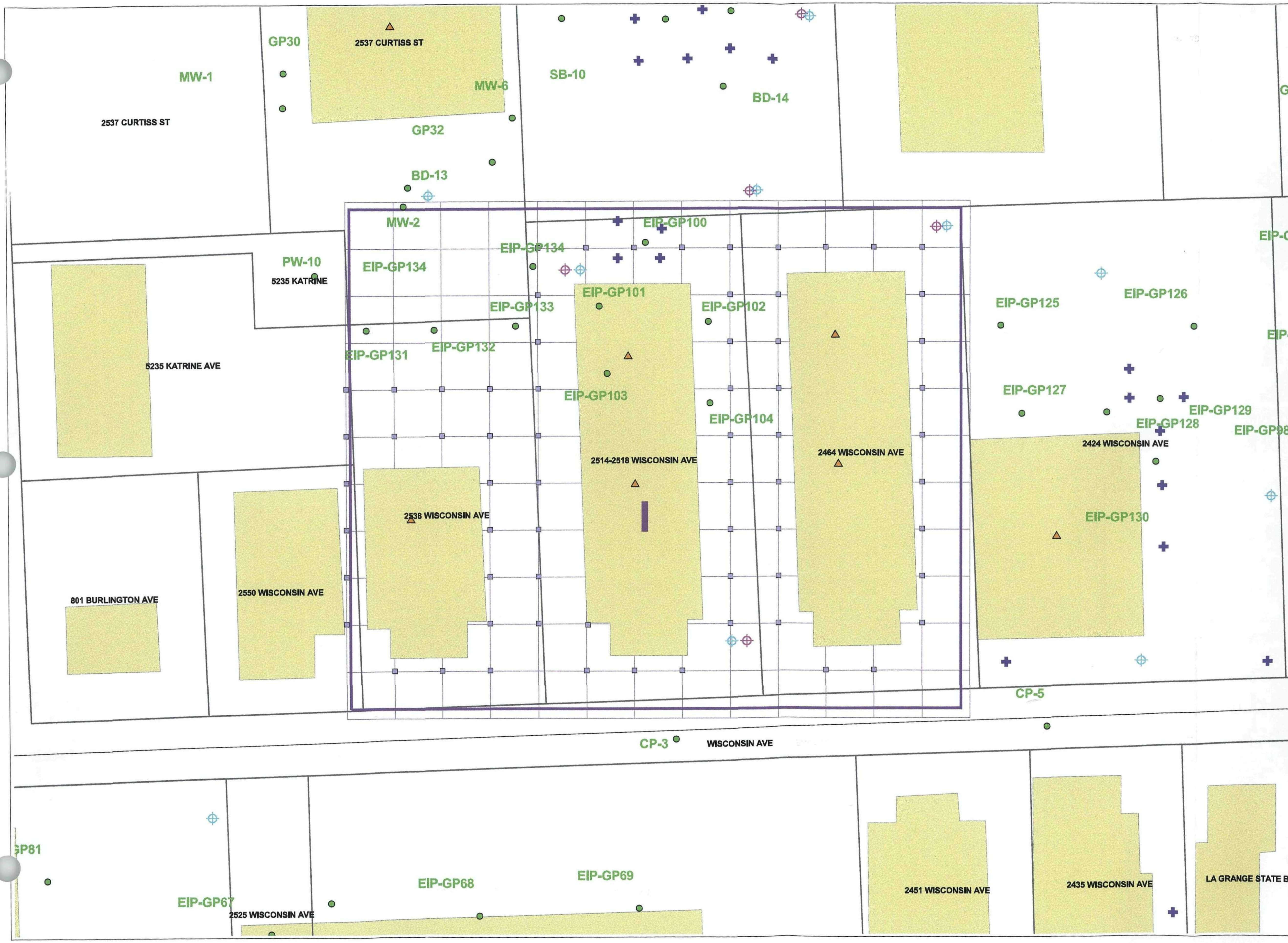
CONTRACT No.:	DELIVERY ORDER No.:
SCALE:	REPORT DATE:
DATE: March 2006	REVISION No.: / FIGURE No.: C-7



LEGEND:

- Proposed Intermediate Monitoring Well Location
- Proposed Shallow Monitoring Well Location
- Anticipated Sub-Slab Gas Sampling Location
- Proposed Soil Boring Location
- Passive Soil Gas Sample Locations
- Existing OU1 Sample Locations
- Primary Study Areas
- Secondary Study Areas
- Parcel Boundaries
- OU1 Boundary
- Buildings
- Railroads
- Roads
- Rivers

Notes: Wells located in close proximity indicate a well nest.

N

0 100 Feet

RESPONSE ACTION CONTRACT
US EPA Contract No. 68-W7-0026
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Proposed Sampling Locations Study Area I

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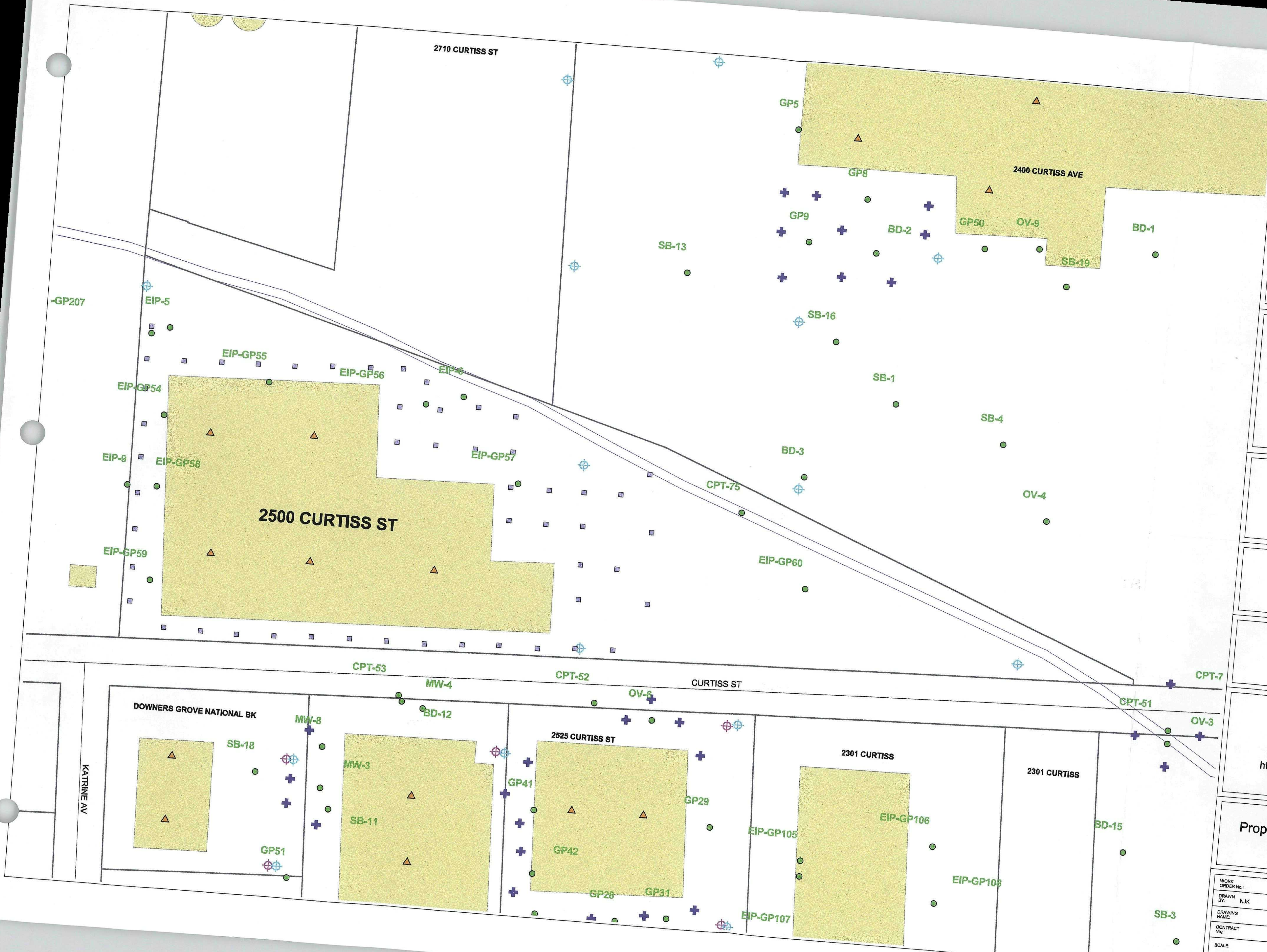
DATE: March 2006	REVISION No.:	FIGURE No.: C-9



LEGEND:

- Proposed Intermediate Monitoring Well Location
- Proposed Shallow Monitoring Well Location
- Anticipated Sub-Slab Gas Sampling Location
- Proposed Soil Boring Location
- Passive Soil Gas Sample Locations
- Existing OU1 Sample Locations
- Primary Study Areas
- Secondary Study Areas
- Parcel Boundaries
- OU1 Boundary
- Buildings
- Railroads
- Roads
- Rivers

Notes: Wells located in close proximity indicate a well nest.

N

0 120 Feet

RESPONSE ACTION CONTRACT
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Downers Grove, Illinois

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Proposed Sampling Locations
2500 Curtiss Street

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SCALE:	REPORT DATE:
DATE: March 2006	REVISION No.:
	FIGURE No.: C-12

LEGEND:

- Proposed Intermediate Monitoring Well Location
- Proposed Shallow Monitoring Well Location
- Anticipated Sub-Slab Gas Sampling Location
- Proposed Soil Boring Location
- Passive Soil Gas Sample Locations
- Existing OU1 Sample Locations
- Primary Study Areas
- Secondary Study Areas
- Other Study Areas
- Parcel Boundaries
- OU1 Boundary
- Buildings
- Railroads
- Roads
- Rivers

Notes: Wells located in close proximity indicate a well nest.

N

0 100 Feet

RESPONSE ACTION CONTRACT
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Work Assignment No. RFW233-RICO-B52A
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Proposed Sampling Locations Property Located South of the Intersection of Curtiss & Glenview, East of Belmont

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